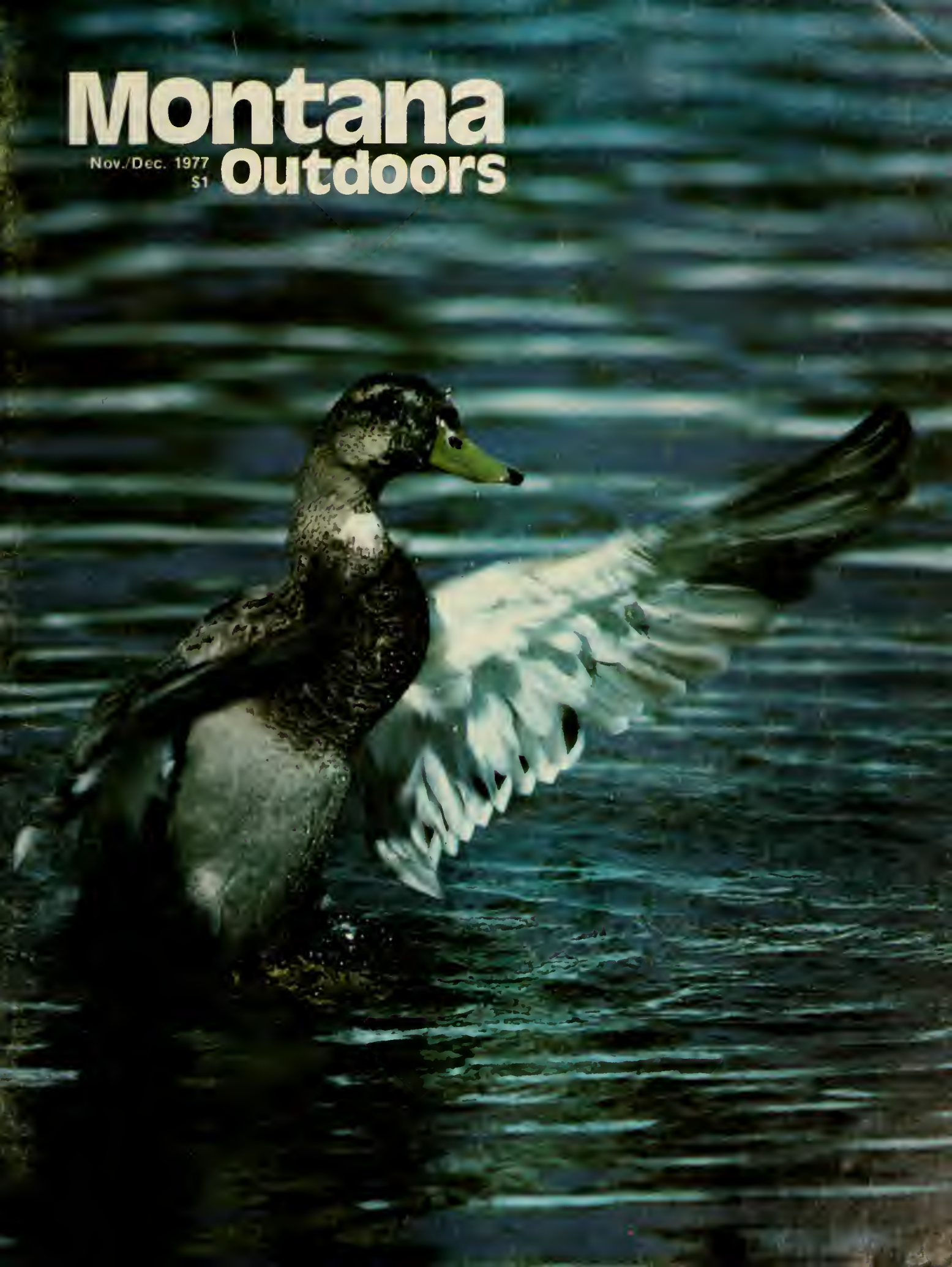
Montana Outdoors

Nov./Dec. 1977
$1



Montana Outdoors Nov./Dec. 1977, Vol. 8, No. 7

2 **Hunter Education**
A training program for new—and experienced—hunters, emphasizing proper ethics, wildlife conservation and safe handling of firearms. by Jim Ramsey

6 **Bad Forestry Practices Are Bad for Wildlife**
An interview with Dr. Robert F. Wambach, examining the impact of forestry practices on wildlife and wildlife habitat

12 **Montana's First Snake Pit**
An unwelcome development moves to the mouth of Rock Creek, a blue ribbon trout stream just east of Missoula. by Glenn Oakley

15 **The Catchall**

17 **Montana Outdoors Index**
A list of articles and short items published in 1977

19 **Waterfowl Scenes for Framing**
Eight fine photos to grace your walls.

28 **Goose Music**
A reprint from Aldo Leopold's conservation classic, "A Sand County Almanac," with photographs

35 **Dear F&G**

39 **The Flathead's Future**
The lower Flathead River is in danger of impoundment—six potential dam sites are under consideration. by Bert Lindler

44 **Sportsmen, Choose Your Path**
Hunting is not a right; it's a privilege. An editorial by Bill Pryor

46 **How Much Is Wildlife Worth?**
The system of attaching monetary value to wildlife is complex and challenging. by Terry Lonner and Verne House

Thomas L. Judge/*Governor, State of Montana*

Joseph J. Klabunde/*Chairman, Fish and Game Commission*

Commission Members:
Spencer S. Hegstad/*Vice Chairman*
Alfred L. Bishop
Arthur C. Hagenston
Land M. Lindbergh

Dept. of Fish and Game
Robert F. Wambach/*Director*
Fletcher E. Newby/*Deputy Director*
Orville W. Lewis/*Associate Director*

Bill Schneider/*Editor*
Kay Ellerhoff/*Associate Editor*
Marty Beatty/*Circulation Director*
Donita Sexton/*Art Director*
Vern Craig/*Artist*
Tom Warren/*Photographer*
Craig Sharpe/*Photographer*

THE COVER: Waterfowl, such as the drake mallard on the front cover (photo: Jon Cates), have long inspired hunters and nonhunters—perhaps more than other birds. So we've devoted a large share of this issue to ducks, geese and swans. See "Waterfowl Scenes for Framing" on page 19 and "Goose Music" by Aldo Leopold on page 28.

Montana Outdoors, the official publication of the Montana Dept. of Fish and Game, is published six times each year (January, March, May, July, September and November). Contributions (manuscripts or illustrations) are welcome with the understanding that the department or the editor cannot be responsible for loss or damage. All contributions will be published at the discretion of the editor. Subscription rates are $3 for one year, $5.50 for two years, $8 for three years and $2.50 for each additional year. (Please add $2 per year for foreign subscriptions, excluding Canada.) Individual copies are available at newsstands and regional department offices. Price per copy is $1. Although *Montana Outdoors* is copyrighted, permission to reprint articles is available by writing our office or phoning us at 406/449-2474. All correspondence should be addressed: *Montana Outdoors*, Dept. of Fish and Game, 1420 E. Sixth; Helena, MT 59601. ©Montana Dept. of Fish and Game 1977. All rights reserved.

Postmaster: *Montana Outdoors* is entered as second class mail in Helena, MT 59601. Additional entry is in Butte, MT 59701.

Ashtons

The Director's Column

Wildlife managers live in a constantly shifting and expanding world. And today, this world seems to be staggering under the weight of an endless array of problems—population, pollution, poverty, hunger, inflation, energy and other resource shortages, etc. — all of which place pressure on the wildlife resources.

The mention of these problems often brings up the subject of "progress" or in the minds of some persons, too much of it. Many define progress as the dictionary does —"moving forward or onward." To others, it means continuous growth and expansion.

However, I have my own definition which seems more appropriate—especially for wildlife agencies. I define progress as the process of effectively coping with change. And since the rate of change in today's world is sometimes hard to even imagine, we must learn to cope with it. Or in my view, we must have progress.

Our greatest hope for this kind of progress is education. If, through better education, we can learn to cope with change, we can continue to protect, preserve and enhance wildlife populations and habitat.

Although I suspect others would have a different interpretation, I break this education process into three categories:

- *Professional training*—In the training of new wildlife professionals, it would be easy to argue that we are doing a good job. Most wildlife curricula are rigorous and demanding. Wildlife schools attract excellent students and because of the high level of competition, only the best survive. But while we can be justifiably proud of the quality of people entering the profession, we should not become complacent. Some serious problems persist in the system.

For example, most wildlife graduates are well trained in biology, but are weak in social and managerial sciences. Also, many are so specialized that they tend to exhibit a professional chauvinism that makes it difficult for them to interact effectively with the public or colleagues in other professions. I could go on, but the point is—there is room for improvement.

- *Continuing education*—In this field, we are doing a barely minimal job. Wildlife managers and biologists need constant updating as surely as physicians, lawyers and engineers do. However, we often fail to meet this need.
- *Conservation education*—The third leg of the education stool is informing the public through conservation education programs. Here, I feel we are doing an excellent job. Or perhaps I should say, we are doing a much better job than other natural resource professions. True, we need to expand the size, scope and diversity of our information and education programs, but basically, we have reason to be proud of our accomplishments in this field.

Two particularly important areas where we must concentrate conservation education programs are (1) informing persons employed by other resource agencies (foresters, planners, civil engineers, etc.) on wildlife and wildlife habitat problems and (2) improving contacts with the nonconsuming public and urban dwellers.

Ignorance and uncertainty breed fear, pessimism and failure; but knowledge in the hands of bright and confident persons can lead only to optimism and success.

For my part, I am completely optimistic that we *will* meet the educational challenge, and we *will* make progress. The wildlife profession is filled with talent and dedication. We are dealing with a subject of widespread natural appeal. We have an effective network of agencies, associations and educational institutions. We have a substantial collection of laws that encourage and support our efforts. We are experiencing improved levels of cooperation from nonwildlife agencies. And our performance to date adds up to an impressive success story that serves as an excellent base from which to project a bright future. I am sure that we have the will and ability to mount an effective educational effort. And this will guarantee progress.

Robert F. Wambach

Department Projects:

Hunter Education

by Jim Ramsey

MY HUNTER EDUCATION INSTRUCTOR had told me I could smell elk. And I really could detect that sweet, musky odor as I followed the large elk track.

At 16, this was my first elk hunt. I was obviously thrilled about the prospect of bringing down one of Montana's most magnificent game animals.

I finally jumped the animal —a big bull— but couldn't get a shot. Disappointed, but still happy with my first real elk hunt, I started back to camp as the light began to fail. Then, a cow elk crossed my path and stood broadside, and I dropped it with one clean shot. My first elk.

Even during this excitement, I remembered my hunter education training—make sure the animal was dead, cut the day and month from my elk tag, tie the tag where it can be seen on the elk, remove the windpipe and prop the animal up after field dressing so air could circulate around it and cool the meat.

After doing all this it was too dark to find my way back to camp—or even to see my tracks in the snow. Recalling my training, I knew I had only one choice—don't travel, build a fire and wait for tomorrow's light. I tore off a large piece of bark and built a fire on it and constructed a crude shelter of boughs to weather the night.

Sure, I was scared. But when the clouds cleared just before dawn, I was alive. The temperature had dropped to zero during the night, and my elk was frozen stiff. Nonetheless, I had survived.

I located the North Star to assure my sense of direction and walked back to camp, tired, but strangely

During their hunter education course, students learn, among other things, how to safely handle guns in the field, the parts of the gun and correct methods for crossing fences and other obstacles. F&G photos

satisfied. My hunter education class had helped me avoid disaster and instead made my first elk hunt a rewarding experience.

I often wonder how many of the over 143,000 Montana hunter education course graduates have likewise "pulled through" because of their training. During the past 19 years, 47% of all Montana boys and girls have taken the course. In addition, thousands of adults have voluntarily taken hunter education. So, I'm sure there are other "survivors."

I frequently remember the 28-year-old hunter who had a similar experience about the same time. Like me, he was caught by nightfall. But, unlike me, he didn't keep his head. He panicked and ran wildly. No, he hadn't taken the hunter education course. And he was found dead.

Wilderness survival is only one vital part of hunter education. It's a comprehensive training program to educate new hunters about the responsibility of proper hunting ethics and safe handling of firearms. Although the course varies with the instructor, most instructors include training in hunter ethics, wildlife management, landowner/recreationist relations, game identification, safe handling and proper care and storage of firearms, wilderness survival, fire building, compass reading and care of game meat to prevent waste.

Originally, the program was restricted to hunter *safety* and was so named. However, the increasing responsibility of hunters to practice proper ethics and wildlife conservation has prompted a modified title — hunter education. Hunter safety is, of course, still a major emphasis of the course, but now it's accompanied by a broad-based hunter education program.

It all started in January 1957 when the Montana Legislature required youngsters from 12 to 14 to pass a course in safe handling of firearms before they could purchase a resident big game license. The Montana Dept. of Fish and Game was charged with administration of the new law. Consequently, volunteer instructors were recruited, a study plan was drawn up, forms and tests were printed and by early 1958, hunter education was under way in Montana.

The 1963 legislature amended the law so no resident hunting license could be sold to anybody under 18 unless he or she had completed the course and could present a certificate of competency to the license agent. This extended the program to bird hunters, where the first law had covered only big game hunters. In 1973, Montana lawmakers further amended the law to require nonresident juveniles to present proof of having passed a course in firearms safety in any state or province before they could be issued a nonresident hunting license.

It has all worked well. In 1976, Montana's program received the top award in international competition among most states and Canadian provinces. This is the second time Montana has won first place. Every time the program has been entered, Montana has placed in the top 10.

Mini-Editorial

Montana is one of the few states that doesn't require firearm users to unload and case their guns when they're in vehicles — an oversight that contributes to most hunting accidents in this state. Hopefully, the legislature can correct this weakness and thus prevent needless fatalities.

Claims that such a law would be "gun control" are *nonsense.* Instead, it is merely *common sense* to enact legislation that saves lives and makes hunting a better sport. The department is, of course, violently opposed to gun control, but Montana needs a law requiring guns to be cased and unloaded when in vehicles. To this end, we encourage hunters to support this legislation if it is introduced.

Since 1958, over 70% of Montana's resident hunting population has completed the course (143,000 of 200,000 hunters). This has obviously gone a long way toward making a great sport safer and hunters more responsible.

The foundation of Montana's program is a qualified crew of about 800 volunteer hunter education instructors. These dedicated persons give freely of their time to make Montana youth better hunters. Without these volunteers, hunter education in Montana would be a token effort, at best, under present budget restraints.

The department prepares a "Montana Hunter Safety Handbook" as a basic guide to instruction and provides the publication free to students. All students —about 8,000 annually — receive a minimum of 10 hours of classroom instruction and demonstration on proper methods of gun handling, i.e., the five "carries," walking in line and abreast, crossing fences and other obstacles, entering and exiting vehicles, basic shooting positions and loading and unloading firearms. Before certification, students must prove to the instructor's satisfaction that they have mastered these functions.

When possible, these demonstrations are conducted in the field with actual fences, vehicles, firearms, etc. In addition, field training in proper hunter ethics and landowner relations, i.e., securing permission to enter private land and respect for private property, are included by most instructors. If the students express interest, some instructors include optional field exercises with black powder firearms and bows and arrows. Shelter construction and other wilderness survival techniques are infrequently demonstrated, but several good films give students the basics.

The program is organized in counties, with volunteer instructors in every county supervised by a volunteer county chief instructor. All 56 counties have a chief instructor and at least one class per year is offered. Occasionally, instruction is required but no certified volunteer instructor is available. In such cases, game wardens (who are all certified instructors) or certain other department personnel teach the course. Department employes have also furnished transportation and other assistance for instructors when it becomes a burden to teach classes in outlying regions.

For certification, instructors must audit a course taught by a certified instructor and then prove competency to that instructor. Instructors must also pass a National Rifle Assn. exam and a brief character check by the department. With funding assistance from the federal level, the department conducts annual workshops in each region for instructors. Or, if the county chief instructor requests, a workshop can be conducted on the county level.

Instructors receive recognition for their sincere efforts at an annual awards banquet. Here, they receive plaques and pins for their years of instruction and number of students educated. However, their true "award" is the feeling of satisfaction for a job well done—making their favorite sport better and safer.

Most firearms accidents result from a lack of hunter safety knowledge or the failure to apply it. In turn, statistics show hunter education programs reduce the number of accidents. As programs continue to grow and improve and as community spirit to reduce hunting accidents swells, surely the future will see fewer accidents.

The course is designed to benefit inexperienced hunters—regardless of age. Although it isn't mandatory for adult hunters to take the course, many of them do. And the department certainly encourages this. Also, it's a great refresher course for experienced hunters.

Unfortunately, Montana still has a few hunting fatalities each year. However, these usually result from Montana's liberal firearm laws or involve persons who haven't taken the hunter education course.

Montana law permits year-round carrying of uncased, loaded firearms in vehicles. In 1976, four fatal hunting accidents occurred, three involving persons riding with loaded firearms in vehicles. The first victim was shot by his companion who was resting his rifle on a vehicle. In addition, Montana law allows anybody who isn't a felon to carry and use handguns.

These two weak spots in Montana law give conscientious firearm owners a bad image. But legislation correcting the problems is viewed as "gun control." Thus, it gets "shot down" in a hurry — even though hand guns and loaded firearms in vehicles account for 50% or more of all hunting accidents every year.

Emphasizing the problems with liberal laws, 53% of the hunting accident victims during a five-year period (1971-75) *had* taken the course. This sounds high, but one must consider most accidents resulted from loaded guns in vehicles. For example, until two years ago, nighttime jackrabbit hunting with vehicles was allowed. At best, this is a dangerous sport; hunters race across open fields shooting rabbits from the vehicle or spotlighting them along roads. Not surprisingly, it accounted for about 10% of the accidents during a three-year period, 1971-73.

Although it hasn't come to Montana in force, anti-hunting sentiment is spreading across the nation. And no-hunt spokesmen continually point out how unsafe and irresponsible hunters are. Every year, some hunters are killed, some livestock is shot, some fences are cut, some game is wounded and left to die a slow death, some animals are illegally killed, some hunters mistake one game animal for another, etc.

A true hunter can't tolerate this. Most graduates of the Montana hunter education course wouldn't dream of doing any of these. Yet, every year, we see such headlines. With strong hunter education programs, we can come closer to the all-important goal of making hunting the sport it's supposed to be, which, obviously, includes a complete absence of the above atrocities. In addition, by "cleaning up our act," we'll take away an effective argument from anti-hunters.

Hunting is an important tool in wildlife management and a culturally rewarding form of outdoor recreation. It's part of the Montana way. An effective hunter education program can keep it that way. ■

What Would We Do Without Them?
by Bill Schneider

The significance of the work of Montana's 800 volunteer hunter education instructors almost defies words. Without them, Montana's award-winning program wouldn't exist. Likewise, there would undoubtedly be more landowner problems, more hunting accidents, more illegally killed game and other fish and game law violations and more criticism of hunting. So, if you're one of these 800 dedicated individuals, I hope you realize how much the department and hunters everywhere appreciate your work. If you aren't an instructor, but know somebody who is, take a minute to compliment him on his community spirit and dedication to making hunting better.

mule deer photo: Jon Cates

Bad Forestry Practices Are Bad For Wildlife

northern three-toed woodpecker photo: Danny On

An interview with Dr. Robert F. Wambach

Obviously, forest products are responsible for a large part of Montana's economy. No doubt, this industry will continue to play a major role in Montana's future. Thus, the Dept. of Fish and Game has become increasingly concerned about the impact of forestry practices on wildlife and wildlife habitat.

Since we are fortunate to have Robert F. Wambach, an authority on the subject, as department director, we thought it appropriate to publish his views. Before joining the department, Wambach was dean of the School of Forestry at the University of Montana in Missoula for five years. He holds a Ph.D. in forest economics. A list of his past positions, professional papers and research projects would probably take more space than the following interview.—Ed.

MONTANA OUTDOORS: You've frequently called attention to Forest Service (FS) inefficiency and insensitivity to radically changing public opinion on the administration of Montana's national forests. Is that your current view?

DR. ROBERT F. WAMBACH: In spite of some significant improvements and sincere efforts on the part of many FS employes, the rate of change has not been fast enough to suit me. From my vantage point, it seems the FS still persists in pursuing its historic, single-minded concern with timber production, often to the detriment of other forest values such as wildlife habitat, soil and water quality, aesthetics, etc; it still pays too little attention to principles of multiple-use management; it continues to employ uneconomical systems of timber management, and it still has not developed a satisfactory system for securing public par-

ticipation in the decision-making process. This last point is considered by many to be the most serious problem because there is still a public demand for environmental preservation, while the FS keeps nurturing the outmoded professional assumption that when commodity values conflict with amenity values, the latter must invariably give. I mean that's a loggerhead—no pun intended.

I must add here, in fairness to the FS, that it may be inadequately funded and understaffed to do a completely effective job of managing all national forest values such as wildlife. I know it's tough to respond to the ground swell of public concern over amenity values when your budgetary emphasis is on commodity production. But inadequate, poorly distributed appropriations are only part of the problem. The FS must modify its concepts of land management to make its programs more compatible with the incredible changes taking place within American culture.

You can't, for example, uniformly persist in intensive timber production programs on public land reserved for general land management. You can't continue policies of expensive site preparation, planting and thinning on poor sites. You can't insist on large-scale spraying of DDT and other pesticides. You can't keep building dense road systems into areas where wildlife is already struggling against habitat encroachment. In the face of the rapid shift in public priorities, you can't do these kinds of things and offer as justification to a disgruntled public that you are underfinanced. The ball is in the public's court, but it isn't playing the game anymore—it is saying, "Stop it." We have to develop realistic bases for management suited to society's changing value systems.

The FS and forestry as a profession are changing in many positive ways, and this is fine; but the process is incredibly slow and ponderous and seems to anticipate nothing, while society's value shift is occurring incredibly rapidly. Perhaps I am simply too impatient; but I believe the situation calls for impatience.

MO: What forest practices seem to you most damaging to wildlife?

WAMBACH: Virtually without exception, all *bad* forest practices are bad for wildlife. Indiscriminate or excessive use of pesticides disrupts natural balance and too often turns out to be uneconomical. The mammoth clearcuts so popular a short time ago proved to be very bad forestry. They frequently resulted in little or no regeneration; they often added to the fire danger, caused erosion and attendant watershed problems and, of course, created great eyesores. And we know wildlife doesn't benefit from vast clearcuts. Animals seldom utilize anything but the edges of such cuts because to feed near the center puts them too far from cover. And for wildlife, the proximity of cover is usually as important as food availability.

Carefully choosing sites for small clearcuts, however, is good forestry and good for wildlife. They stimulate forage plant growth and enhance the food and shelter combination animals require.

There are, of course, many logging practices common in Montana which are detrimental to wild animals and fish. We continue to construct roads on fragile sites and at steep grades which virtually insures future slumping, erosion and other watershed damage which can have an undesirable impact on fish habitat in our streams. We still permit the leaving of cull and genetically inferior trees to regenerate forest land which makes no economic sense in the long run and often results in poor habitat for certain important animals. We still allow loggers to cut corners on slash disposal which creates fire hazards and, in too many instances, impedes or stops animal travel altogether in massive slash-covered areas. Sometimes slash is several feet deep.

Montana, incidentally, is one of the few states which does not outlaw logging across streams, the effect of which has been to increase sediment load in our watersheds with attendant silting over of fish spawning grounds, destruction of stream bed insect life (on which the fish feed) and general degeneration of water quality.

But one of the *most* debilitating practices in forestry, both to wildlife and forest values, is the monoculture approach to timber production. A monoculture excludes all types of trees but one, say Douglas fir, thus eliminating the diversity so absolutely necessary to wildlife success. Left to her own devices, nature creates a diversity of plant and animal life and this diversity makes for ecological stability. The system protects itself. A monoculture creates a kind of biological desert in the forest that is more susceptible to disease, insect infestations and fire and which may seriously deplete soil nutrients. If you have a forest consisting of Douglas fir exclusively, and an insect fatal to fir passes through, that whole forest is doomed — when diversity would have saved it. In areas where animals have no suitable alternative habitat, they, too, go the way of the affected forest.

As I said earlier, bad forest practices are almost always bad for wildlife. The converse is also usually true, i.e., good forestry practices are usually good for wildlife.

MO: What about forest areas where nature has allowed only one species of tree? Should these areas be thinned and planted with other species?

"In most cases, the proposed wilderness sites are infinitely more valuable as wilderness or other low intensity use than as commodity timber land."

WAMBACH: Well, this is kind of rare in nature, but if nature lays it out that way, the single species will be successful until nature chooses to alter the forest and that alteration usually occurs gradually or piecemeal, so the whole area isn't devastated by the change. Although such an arrangement isn't conducive to animal success, I wouldn't advise tampering with nature's handiwork. First, because such instances are rare and second, if a natural monoculture exists, there is probably some good reason for it that would negate the effort to change it.

MO: Much has been written on the advisability of altering climax (mature) forests to improve the diversity of the vegetation wildlife requires. What are your thoughts about this?

WAMBACH: Well, in a climax forest, the timber canopy typically closes out the light and limits the variety of vegetation in the understory. Here again, the diversity factor required by wildlife is impeded and what undergrowth remains is very slow growing.

Wildlife fares very poorly in a climax forest. Animals favor what we call the seral stages of forest development which are somewhere between the pioneer or earliest stages of vegetative cover and the mature, self-sustaining forest. Vegetation in these seral stages is as lush and diverse as it will ever be, and is most compatible with the needs of wild animals. So, in certain instances, it is definitely advantageous to set back the economical succession of the forest to some intermediate or seral stage of development.

MO: Does this mean thinning and burning?

WAMBACH: Yes, thinning or burning are two of several techniques that can be effective. To set back succession in a mature virgin forest, we must make fairly radical alterations to secure the desired impact. Prescribed burning, planting of larch and pine or other light-demanding tree species, heavy thinning, planting forage vegetation and making small, well-spaced clearcuts are all ways to set back succession and thus stimulate a more successful wildlife habitat. To many people, these methods may sound heavy-handed, but climax forests are simply not, as a rule, good animal habitat and will severely reduce wildlife diversity and population levels in areas where alternative food sources aren't available during critical times of the year.

"From my vantage point, it seems the Forest Service still persists in pursuing its historic, single-minded concern with timber production...."

With rare exceptions, nature favors variety and our experience tells us that, to the extent we emulate nature, wildlife will be prosperous and forest values will be sustained. In man-induced monocultures, the danger of catastrophe is great. When we deviate from what nature so *obviously* favors, we do so at a considerable risk, as the French and others discovered when monocultural practices wiped out much of their wildlife and seriously depressed their timber industry through fire loss, disease and decline in soil productivity. When we *do* alter conditions, we should consider how nature might go about correcting a problem if she shared man's timetable. But we should be very cautious. In agriculture, we can usually correct our mistakes *before* we suffer too badly, but in forestry, we often pay for bad judgment for two or more human generations.

MO: Logging practices on nonindustrial private forest land are an increasing concern to forest and wildlife managers, yet little headway seems to have been made toward insuring that sound management is the standard. What can be done to accomplish higher quality forestry on private land?

WAMBACH: In terms of methodology, the answer to that question isn't difficult. Implementation is a bit thornier. It's easy to say that owners of nonindustrial private forest land would benefit from a more thorough orientation in principles of good forestry practices, as would the wildlife living in these areas. But it's no small feat to convince landowners to resist the temptation to opt for quick money at a time when inflation has stretched their resources to the breaking point. With cattle prices so depressed, many ranchers see that stand of timber on the hill as a way to mitigate their losses or even as the difference between having to sell out and hanging on another year. If they had their "druthers," most probably would prefer to manage that forest as a renewable resource and insist on logging it in a way compatible with the needs of the resident animals. But economic necessity often takes precedence over these other concerns.

Far too often, though, the owners of commercial timber tracts are simply unaware what standards of logging they have a right to expect on their land. When you consider that nearly *one-third* of Montana's commercial timber is privately owned and that a significant percentage of our wildlife occupies or traverses such land, it seems imperative that Montana adopt some kind of forest practices act to regulate timbering methods on state and private land, such as has been so successful in neighboring states. This should require specific standards in logging road construction. It should insist on rapid reforestation, set rules for use of pesticides and prohibit logging across streams. Such rules or standards are really needed if we are to protect soil, water and wildlife.

Strict forest practices acts in other states have been the salvation of their forests and have been applauded by private landowners. Small landowners with

commercial timber potential in these states are taking advantage of the expert forestry advice provided by state foresters, and small loggers operating under these restrictions are finding that *good* logging *pays*. It insures a healthier future timber industry which, in turn, loosens up the financing for logging enterprises because of increased economic potential and stability infused into the profession by the forestry act.

That many of the biggest logging outfits in these neighboring states (and in Montana) have supported forest practices acts as desirable and profitable runs counter to speculation here in Montana that such acts impede progress in the profession. Where such acts have been adopted, federal forestry agencies usually comply *voluntarily* in managing within the state public land. Then, too, if a state act isn't adopted pretty soon, we may have to live with federally imposed forestry standards not necessarily compatible with Montana's special characteristics. Gov. Thomas L. Judge, I know, strenuously objects to the federal government presuming to tell us how to manage all aspects of our own affairs.

MO: Would you advocate closing roads after logging is completed in areas where a delicate survival balance exists for animals?

WAMBACH: Yes, in many situations I would, at least until that balance is less delicate. I know that's an unpopular view with some people. They would charge me with violating principles of multiple use. But there is no question that in logged areas where wildlife is sparse and struggling with an inadequate habitat anyway, the maintenance of the access roads will have a more debilitative impact on animals than logging itself had. And it's not in the interest of multiple-use values to have ready access to wildlife habitat where that access means its total decimation in an area.

Conversely, in areas where game populations have exploded above the habitat's capacity to support them, I would not only favor keeping the roads open but would prescribe they be maintained and, in some cases, improved. Access roads can be a significant wildlife management tool or handicap, depending on how they are used.

MO: What is your reaction to the considerable controversy and second-guessing over the possibility of new wilderness designations? Are loss of employment and timber revenue necessary by-products of more wilderness?

WAMBACH: I think much of the controversy stems from misunderstanding. Many people hear about plans for expanded wilderness and imagine huge tracts of productive forest withdrawn from our already depressed state economy. The fact is, for the most part, the areas under study for wilderness designation are *marginal* timber-producing sites where logging has a low economic feasibility. By this I mean the timber is small, slow growing and situated in rugged country where road construction costs alone would preclude profit in logging there.

"...For the most part, the areas under study for wilderness designation are marginal timber-producing sites where logging has a low economic feasibility."

In most cases, the proposed wilderness sites are infinitely more valuable as wilderness or other low intensity use than as commodity timber land. Our lumber industry should be concentrating on areas in western Montana where we could actually expand production by 70% or more through more intensive forest management.

But I should also make it clear that "wilderness" classification is not necessarily good for wildlife. If the definition of wilderness is too rigorous or if wilderness policy is too restrictive, it makes wildlife management very difficult, if not impossible. I believe in keeping a lot of our backcountry in a wild condition, but *wilderness* classification by itself may not be the entire answer.

MO: What specifically could be done in western Montana that would increase timber production by a significant amount?

WAMBACH: Let me just list a few ideas: well-conceived programs of commercial thinning of young stands, genetic improvement, fertilization, better utilization and *carefully* administered insect control (and I emphasize the word "carefully"). All of these methods used in conjunction will induce substantial expansion of the timber industry. But these methods only pay dividends when utilized in areas where soil and climate and other conditions make for speedy growth and where other forest values are not severely impaired. Wildlife, for example, must have a nearby alternative habitat, etc.

Timber in eastern Montana is almost all marginal and it must be carefully managed, not to expand logging, but simply to maintain the *status quo*. And even that appears a dubious expectation looking down the road 10 or 20 years.

I'm most appreciative of Montana's need for a healthy logging industry, but *not* at the sacrifice of all the other forest values, not the least of which is wildlife habitat.

I think with the currently available technology and carefully planned and executed management and with sufficient investment capital, it's not unreasonable to expect a long and fruitful future for the timber industry in Montana, but that industry must *also* be willing to make certain sacrifices to insure other forest values. ■

Montana's First Snake Pit

by Glenn Oakley
cartoons by Vern Craig

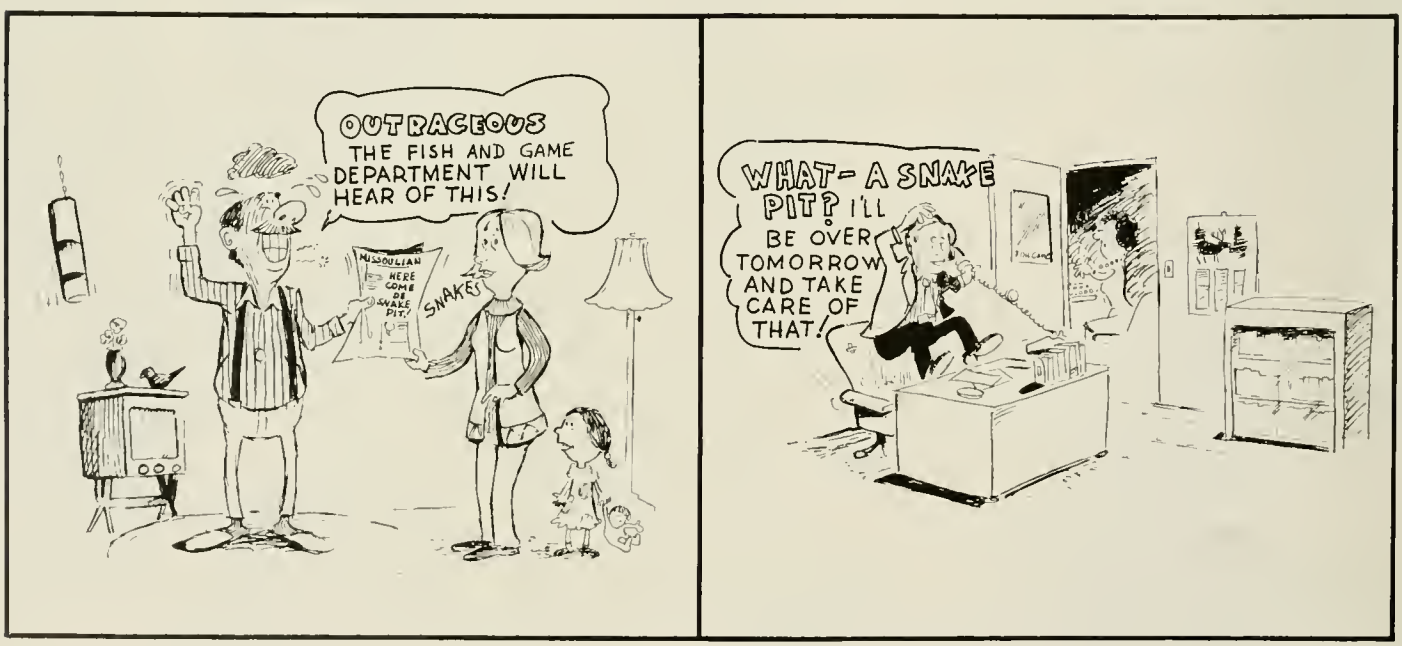
It walks. It talks. It crawls on its belly like a reptile. To the dismay of many Montanans, it has moved to Rock Creek. Worse, nobody seems able to stop it.

Ted "Tex" Cordell packed up his 350-pound python, teguexin lizard, eight-foot replica of a Bigfoot skeleton and some 70 snakes that composed the Snake Pit and moved them from Stateline, Idaho to the Rock Creek Lodge at the Rock Creek interchange, 25 miles east of Missoula. Cordell decided to move his sideshow when Interstate 90 bypassed his former establishment in Idaho.

The debut of the Snake Pit at the mouth of one of Montana's blue ribbon trout streams was announced when Cordell boasted to the Missoulian, "I'm going to put up a $30,000 electric sign with a big hand pointed at the Snake Pit. It'll have a flasher, too."

Response by local residents was somewhat less friendly than sending out the Welcome Wagon committee. Montana Dept. of Highways officials said such flashers are illegal on signs along highways, and such a sign as Cordell proposed would not be allowed.

The Missoula County Commissioners discussed possible ways of stopping the Snake Pit from opening at Rock Creek Lodge, but Deputy County Attorney Mike Sehestedt said there doesn't appear to be any action that can be taken. He said the Rock Creek Lodge area is unzoned, and zoning it now would not affect establishment of the Snake Pit since "after the fact" laws are unconstitutional. The county commissioners are responsible for seeing to it that Cordell's business meets sanitary requirements. So far,


OUTRAGEOUS
THE FISH AND GAME DEPARTMENT WILL HEAR OF THIS!
MISSOULIAN
HERE COME DE SNAKE PIT!
SNAKES
WHAT- A SNAKE PIT? I'LL BE OVER TOMORROW AND TAKE CARE OF THAT!

Sehestedt said, Cordell has met all sanitary regulations and has an "excellent" sewage disposal system. He said the county will be monitoring the Snake Pit for health standards and "will proceed expeditiously" if any violations occur. Sehestedt said of the Snake Pit, "Tacky it is, but tacky is not a violation of the law."

The Montana Wildlife Federation (MWF) and the Western Montana Fish and Game Assn. (an affiliate of the MWF) both opposed establishment of the Snake Pit at Rock Creek. In a letter to Gov. Thomas L. Judge, the MWF argued the Snake Pit will (1) bring increased congestion to Rock Creek, (2) overburden the area's camping and recreational facilities, (3) add increased angling pressure (primarily from out-of-staters) to one of Montana's most heavily fished streams, (4) significantly detract from the area's aesthetic qualities, (5) establish an undesirable precedent for land use along Rock Creek and (6) be generally detrimental to the environmental quality of the fragile Rock Creek drainage. The federation asked the governor to direct the Dept. of Fish and Game, the Dept. of Highways and the Dept. of Health and Environmental Sciences to "accurately assess the impacts of the Snake Pit development."

The Fish and Game Commission asked Director Robert F. Wambach to explore ways to halt the opening of the Snake Pit at Rock Creek. Under the Zoo and Roadside Menagerie Act, all roadside animal exhibits must obtain a permit from the department. The act sets standards for insuring public safety and humane treatment of animals at menageries. Although the buildings that would house the menagerie and curio shop are not yet completed, Warden Capt. Earle Davis said from what he has seen, the Snake Pit will meet standards set by the act.

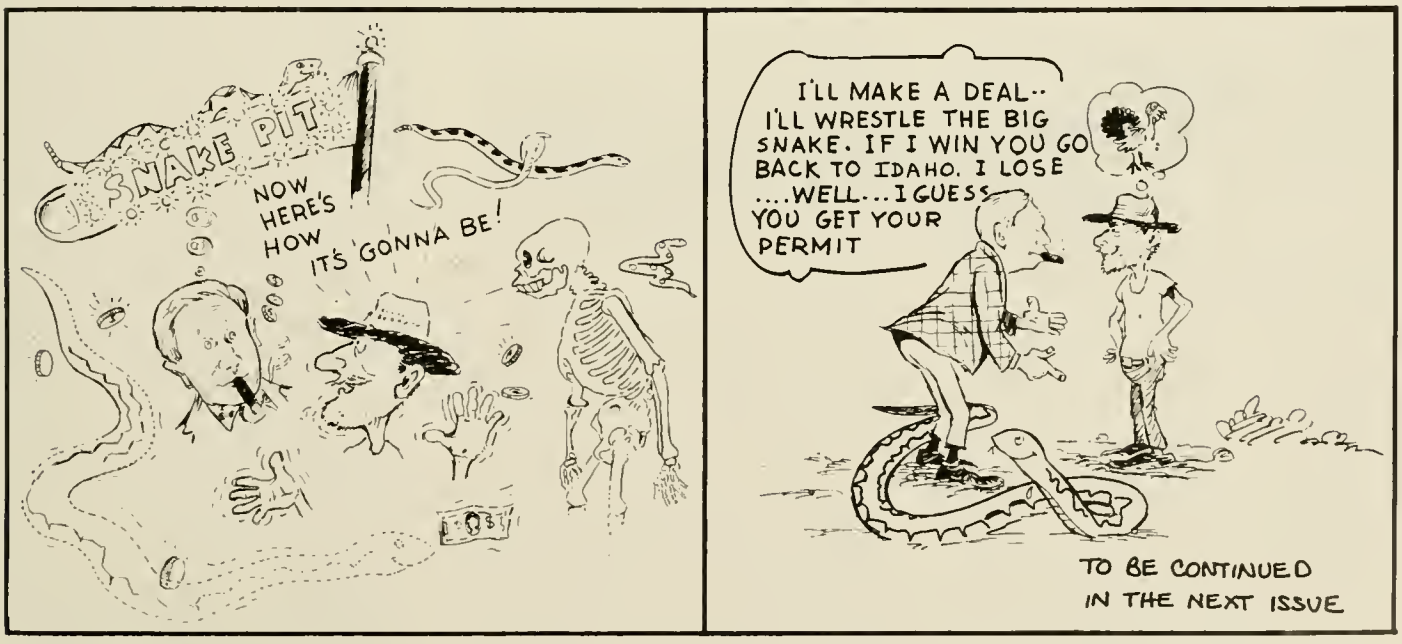
However, Jim Posewitz, administrator of the Ecological Services Division, said a preliminary environmental review is required under the Montana Environmental Policy Act (MEPA) before the department can issue a permit for the Snake Pit. The preliminary environmental review will deal mainly with aesthetic impacts of the Snake Pit. Posewitz said MEPA does include social, cultural and aesthetic factors in its definition of "environment." preliminary review will help direct fish and game commissioners in their decision on whether to issue the roadside zoo permit that Cordell needs before he can open the Snake Pit. (Cordell refused to talk to *Montana Outdoors* about his Snake Pit.)

After completing this preliminary review, the department's Region Two (Missoula) staff submitted it to the director for approval. This means in the words of Warden Capt. Davis, "An environmental impact statement is not necessary for this project."

The impact of the Snake Pit on Rock Creek would largely depend on "how it's advertised," said Hugh Zackheim, executive director of the MWF. Zackheim said he particularly feared signs advertising, "Snake Pit, at the mouth of the famous Rock Creek trout stream." He said it is likely that tourists who stopped at the Snake Pit would stay to fish or camp along Rock Creek.

If established at Rock Creek Lodge, the Snake Pit could result in increased use of the stream, which would be an indirect effect. Since the Snake Pit would be established at the site of the already existing Rock Creek Lodge, the additional buildings to house the snakes and trinkets would probably not cause additional damage to the physical environment, especially considering the site is situated between Interstate 90 and railroad tracks.

Perhaps the issue was best stated by a contract garbage collector along Rock Creek who, speaking in favor of the Snake Pit, said, "More people, more garbage."■


SNAKE PIT
NOW HERE'S HOW IT'S 'GONNA BE!
I'LL MAKE A DEAL-- I'LL WRESTLE THE BIG SNAKE. IF I WIN YOU GO BACK TO IDAHO. I LOSE ....WELL...I GUESS YOU GET YOUR PERMIT
TO BE CONTINUED IN THE NEXT ISSUE

F&G photo: Mike Aderhold

What in the world are we doing?

The Catchall

Toxic Algae Invade Hebgen Lake

The trouble at Hebgen Lake, just west of Yellowstone National Park came quickly and unexpectedly. Effects were lethal, as evidenced by the deaths of almost 40 cattle and several dogs. Within a matter of days, many Montanans had heard a new term, "blue-green algae." But some were confused and a little frightened by these microscopic water plants that killed full-grown cows in minutes.

Algae are very simple plants without roots, stems or leaves. And they are primitive, having been around for many millions of years. Like "higher" plants, they contain chlorophyll and are able to manufacture their own food. Algae account for much of the scum seen on ponds, help make stream bottoms slippery and sometimes trail long green streamers in the current.

The eight major groups of algae are distinguished mainly by their colors. The only poisonous fresh-water algae belong to the group called "blue-greens" because of their predominantly blue–green color. Blue-greens are the most primitive of algae and are considered by some scientists to be more closely related to bacteria than to other algae. Individual plants are microscopic, but when conditions are favorable, as they were in Hebgen Lake this summer, they may aggregate quickly into a dense floating mass called a "bloom." The appearance of blooms has been described as "green latex paint" and "pea soup." The two factors thought to be most responsible for initiating blooms are high levels of plant nutrients (mostly phosphorus) in the water and warm water temperatures.

About a dozen species of blue-green algae are toxic. The most persistent troublemakers belong to three subgroups called *Anabaena*, *Aphanizomenon* and *Microcystis*—or "Annie," "Fanny" and "Mike" for short. The full name of the Hebgen Lake culprit is *Anabaena flos-aquae*. These algae are found in hard water lakes and ponds throughout temperate North America, but strangely, they are not always toxic.

Annie, Fanny and Mike are usually toxic only at or shortly after the peak of a bloom and when winds further concentrate the algae along shore, as in the Hebgen Lake case. One bloom may be just a smelly mess, while another bloom of the same species may be deadly. Apparently, the particular strain of the species causing the bloom will determine whether it is poisonous or merely a nuisance. These strains—harmless or deadly—look identical under the microscope.

Anabaena in Hebgen Lake produced a toxin known as "very fast death factor" (VFDF). Mice injected with Hebgen Lake VFDF at Montana State University died within 30 seconds. The toxin blocks the conduction of nerve impulses to muscles, including those controlling the breathing apparatus. There is no antidote except to feed the afflicted animal a slurry of charcoal to absorb the poison before it enters the animal's system through the lining of the gut. Symptoms start with periods of excitability, followed by loss of equilibrium, convulsions and finally, respiratory failure.

Blue-green blooms are toxic to a variety of warm-blooded birds and mammals. One severe episode reported from Storm Lake, Iowa in 1952 accounted for the deaths of 5,000-7,000 gulls, 560 ducks, 400 coots, 200 pheasants, 15 dogs, 2 hogs and an unknown number of squirrels and muskrats. Cases of human poisoning are rare, probably because the objectionable taste and appearance of the water would discourage anyone from drinking it intentionally.

There is no evidence that fish have died from the Hebgen Lake bloom and fish are not believed to accumulate the toxin in their tissues or become toxic to animals that may eat them. Fish from the Grayling Arm of Hebgen Lake were analyzed after the toxic bloom this summer, but no toxin could be detected.

The seed for toxic algae blooms is widespread. A study conducted in 1975 found potentially toxic blue-green algae in 25 of 100 stock ponds in eastern Montana, although in only two cases did they reach bloom proportions. In a drought year with lower water levels and warmer temperatures, the potential for blooms is greater. Even so, toxic blooms appear suddenly and without warning and even the most capable scientist could not have predicted the Hebgen Lake problem this summer or the similar problem in Long Lake near Spokane, Wash. In fact, the toxic species that grew so profusely in the Grayling Arm had not been recorded in Hebgen Lake before this summer.

As surely as such blooms appear, they disappear with the changing seasons. Just how long they last depends on the weather, primarily temperature. With the end of summer, algae growth slowed and stopped. The toxin dissipated, and the 1977 Hebgen Lake bloom became history.

Will it return? Nobody knows. It could never happen again. Or it could happen next year.—*Dr. Loren Bahls and Vern Craig*

Montana's Future

It's official. Montanans favor (1) exclusion of vital wildlife habitat from strip mining, (2) laws to allow access across private lands to public lands and (3) preservation of environmental quality at the expense of economic growth.

These are only three of the high points in Gov. Thomas L. Judge's "Montana Futures" survey released earlier this year. Of 5,100 questionnaires sent, over 1,500 were returned. And the results were, at times, surprising.

For example, Montanans:

- are evenly split on whether or not there should be a state land use agency to properly plan development in Montana.
- favor a law which would guarantee access across private lands to public lands for recreation (45.5% for, 42.5% against).
- appear eager to reduce recreational facility services when faced with a financial crunch, instead of consenting to pay higher taxes to maintain or improve those services (76.5% for reducing services, 23.5% for increasing taxes).
- consider bikeways the fifth priority

recycled paper

in local transportation need behind (in this order) arterial highways, rural roads, buses and airports.
• gave parks and recreational facilities lower priority than police and fire protection and health and sanitation, but higher priority than welfare.
• view a major energy conservation program as having a "positive impact" on inflation, taxes, size of government, number of jobs, standard of living and growth of economy.
• are more sympathetic to "preserving the environment" than "economic benefits" when conflicts arise between the two goals. In fact, there was *no* support for economic gain at any cost to the environment.
• favor in-state conversion of coal into other energy sources (61% for in-state conversion, 23% against) and oppose exporting coal to be converted elsewhere (43.5% against exporting, 39% for).
• favor state regulation of where and when coal is mined.
• strongly oppose strip mining land with high wildlife, agricultural or livestock value.
• forcefully favor preserving land for food production.
• mildly agree with the statement that land use should be based on the greatest economic benefits (44.5% agree, 38% disagree).
• clearly gave the highest priority for water rights to agriculture. Domestic needs were next in favor. Fish and wildlife ranked third ahead of municipal, industrial, mining and recreational uses.
• consider wildlife an important resource for hunters and "general observers." Over 55% of the men and 20% of the women said they hunted, and whether they hunt or not, over 70% made a special effort to observe wildlife in its natural setting.

A complete copy of the governor's survey is available from the Governor's Office, State of Montana; Helena, MT 59601.—*Bill Schneider*

Working for the Community

Suppose a mining company decides to start a smelter and open pit mine almost in your backyard or a real estate developer proposes a 1,000-unit subdivision for your neighborhood? And you can't get answers to questions on the impact on wildlife, water quality, schools, safety, land values, taxes, utilities, recreation facilities and agriculture. In many such cases, Montanans feel somewhat helpless and sooner or later ask, "What can I do?"

In response to this all-too-common dilemma, the Helena-based Environmental Information Center has published the "Community Workbook." It contains advice on what citizens can do when faced with such development and gives addresses of agencies and officials they can contact for more help.

The workbook—which was prepared with a grant from the U.S. Dept. of Health, Education and Welfare—is available free from the Environmental Information Center, Box 12; Helena, MT 59601.—*Bill Schneider*

The Little Things Count Up

Turning the water heater thermostat from 140°F (60°C) to 120°F (48.9°C) cuts energy use by 6%.

* * * * *

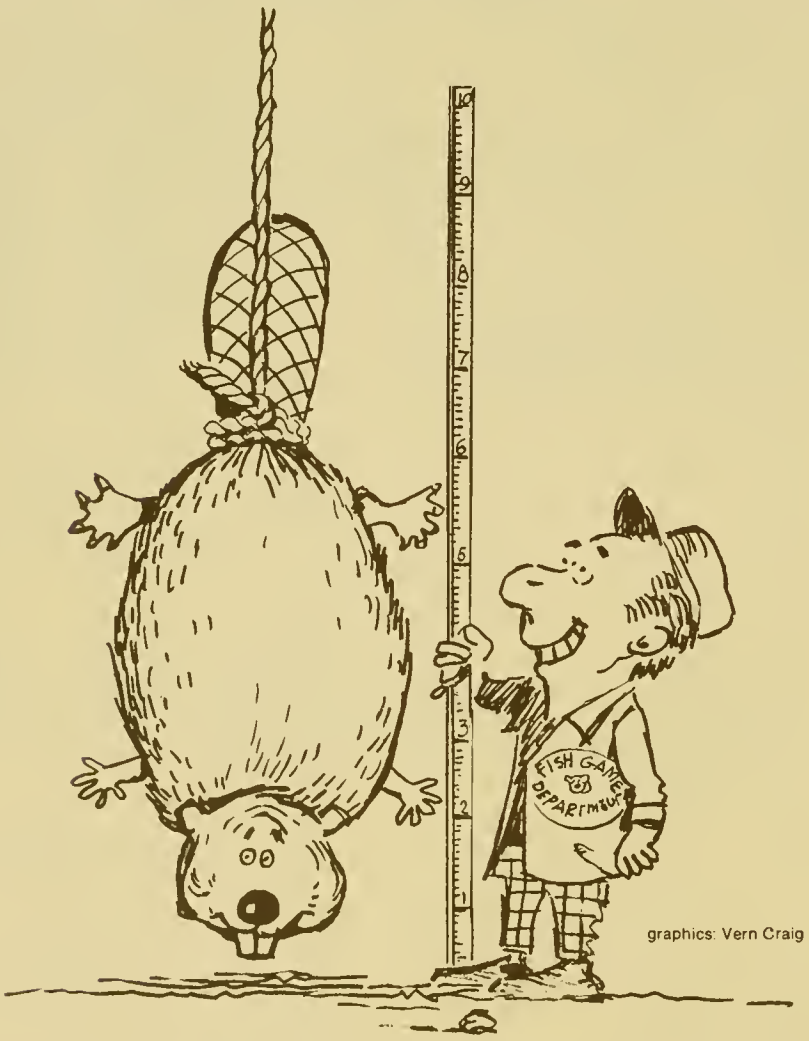
Ovens are usually more efficient than surface units, so meals prepared in the oven save energy.

* * * * *

Microwave ovens use less electricity than conventional ovens.

* * * * *

Most homes lose the greatest amount of heat through the roof which is, incidentally, also the easiest part of the house to insulate.—*courtesy the Montana Energy Advisory Council*



graphics: Vern Craig

Yes, beavers get big, but not *that* big. In the Sept./Oct. 1977 issue of *Montana Outdoors,* we reported that Montana's largest rodent, the beaver, grew to a length of eight feet and weighed 70-80 pounds. This is one typographical error that slipped through. The beaver's maximum length should have been three feet.—*Ed.*

Montana Outdoors Index

The following is a list of articles published in Montana Outdoors *in 1977. Extra copies of all issues, except the special Yellowstone edition, are available from* Montana Outdoors, *Dept. of Fish and Game; Helena, MT 59601. Price for all back issues is $1.*

FISH/FISHING

"The Whitefish"—One of Montana's favorite game fish is spotlighted. Jan./Feb. 1977

"State Fish Nominated"—Montana's blackspotted cutthroat trout gets the green light. Catchall, Jan./Feb. 1977

"Montana Fishing Records"—Three state records are broken. May/June 1977

GAME/HUNTING

"Can Grizzly and Man Coexist in the Parks?"—Suggested solutions for problems in our national parks. Editorial, Jan./Feb. 1977

"Going Home"—The intriguing process by which animals return to the same seasonal ranges year after year. March/April 1977

"Placing American Wildlife Management in Perspective"—Reprint from a brochure published by the Wildlife Management Institute. March/April 1977

"Caution—Deer Crossing"—Some statistics, precautions and what to do if you hit a deer. Catchall, May/June 1977

"Wildlife Shorts"—Interesting statistics about animals. Catchall, Sept./Oct. 1977

"Snipe Hunting"—A look at hunting one of Montana's newest game (shore) birds. Catchall, Sept./Oct. 1977

"New Bird Book Available"—Review of a comprehensive new book about various game birds. Catchall, Sept./Oct. 1977

"Waterfowl Scenes for Framing"—Eight of our best waterfowl shots to grace your walls. Nov./Dec. 1977

"Goose Music"—A reprint from Aldo Leopold's conservation classic, "A Sand County Almanac," with photographs. Nov./Dec. 1977

"How the Public Sees Today's Hunter"—Bad acts of a few create a lasting impression. Catchall, Jan./Feb. 1977

"Hunting Beyond the Bicentennial"—The future of hunting depends on hunters. Editorial, Jan./Feb. 1977

"Anti-Hunting: A Wasteful Issue"—Reprint from Winchester-Western's Conservation Dept. July/August 1977

"Hunting—What About the Future?"—Some statistics and recommendations for preservation of this sport. Catchall, July/August 1977

"Good Hunting: The Real Secret"—How a true sportsman derives maximum benefits from the outdoor experience. Catchall, Sept./Oct. 1977

GENERAL INTEREST

"Some Sportsmen Do Their Share"—Combined efforts of concerned sportsmen pay off for Canada geese. Catchall, March/April 1977

"Montana Stars on TV Series"—Accredited television course about Montana, sponsored by National Science Foundation. Catchall, Jan./Feb. 1977

"The Weed Control Follies"—Few controls govern destruction of an important wildlife food source. Jan./Feb. 1977

"More on Beaver Creek South"—Update on a landmark case. Update, March/April 1977

"Controlling Mosquitoes"—A description of the mosquito problem in Montana and some possible solutions. May/June 1977

"Boating Safety Laws"—A history of boating laws in Montana and some reasons for their enactment. Catchall, May/June 1977

"1977 Legislative Roundup"—Recap of 1977 environmental legislation. Catchall, July/August 1977

"The Little Things Count Up"—Energy saving tips for the consumer. Catchall, Sept./Oct. 1977

"Bad Forestry Practices Are Bad for Wildlife"—An interview with Dept. of Fish and Game Director Dr. Robert F. Wambach. Nov./Dec. 1977

"Montana's First Snake Pit"—An unwelcome development near Rock Creek, a blue ribbon trout stream not far from Missoula. Nov./Dec. 1977

HABITAT DESTRUCTION

"Flathead Leases Postponed"—Federal oil and gas leases temporarily curtailed. Update, Jan./Feb. 1977

"Ski Yellowstone Gets Green Light"—Another threat to the Gallatin's wildlife moves ahead. Update, Jan./Feb. 1977

"Saline Seep"—A costly problem continues to worsen and the state's wildlife pays part of the heavy cost through lost habitat. March/April 1977

"Oil and Gas Leasing"—Wildlife habitat is at stake in the game of oil and gas roulette. May/June 1977

"Preserving the 'Old Ways' Is Appealing, But This Is Ridiculous"—An outdated federal mining law jeopardizes everything but the miner's pocketbook. Editorial, Sept./Oct. 1977

"The Saga of Silver Creek"—Miners sacrifice a cutthroat trout population for gold and silver. Sept./Oct. 1977

continued

"There's a Red Flag on Deer Mountain"—A subdivider's red flag signifies doom for deer and other wildlife. Sept. Oct. 1977

LAND, PUBLIC

"Land Donation Includes Moose Winter Range"—Generous nonresidents donate key moose habitat near Cooke City. Catchall, July/August 1977

"Land Acquisition"—A look at the department's land acquisition program—past, present and future. Sept./Oct. 1977

LANDOWNER/RECREATIONIST RELATIONS

"Commission Selects Landowners of the Year"— Seven landowners are recognized for their efforts on behalf of recreationists and wildlife. Catchall, Jan./Feb. 1977

"In Search of a Better Relationship"—Recognition of land access problems in Montana. Sept./Oct. 1977

"Two Hunters View Access Problems"—Recreationists discuss access problems and possible solutions. Sept./Oct. 1977

"Anglers Have Access Problems, Too"—A fisherman's perspective on access problems. Sept./Oct. 1977

"It's Your Place, Too"—National Shooting Sports Foundation outlines the recreationist's responsibility for the land, whether public or private. Sept./Oct. 1977

LAW ENFORCEMENT

"Wildlife and Law Enforcement"—Adequate regulation and enforcement contribute to successful wildlife management programs. March/April 1977

"Hunter Education"—One of the department's most important projects can save your life. Nov./Dec. 1977

"Sportsmen, Choose Your Path"—Sportsmen are urged to police their own ranks to help augment wildlife agencies' officers in an almost impossible task. Editorial, Nov./Dec. 1977

NONGAME WILDLIFE

"National Nongame Legislation Coming"—Provisions for federal funding may be imminent. Update, Jan. Feb. 1977

"Sportsmen Buy Colorado Nongame Stamps"—Hunters and fishermen purchase the majority of stamps. Catchall, Jan./Feb. 1977

"Bats Need Friends, Too"—A close look at a fascinating and misunderstood Montana mammal. March/April 1977

"Bringing the Bobcat Back"—Reclassification can provide for management of precarious bobcat populations. Catchall, March/April 1977

"It Was a Bad Winter for the Coyote"—Top coyote pelt prices result in a record take. Catchall, May/June 1977

"The Thunderpumper"—A look at the American bittern. July/August 1977

PEOPLE

"Wambach Takes the Helm"—The department gets a new director. Catchall, March/April 1977

"Brandy"—A tribute to the late G.M. Brandborg and his contributions to forest management. Catchall, July/August 1977

"Bishop, Lindbergh Join Commission"—Two new members join the Fish and Game Commission. Catchall, July/August 1977

RECREATION

"The Land and Water Conservation Fund"—Money is available for acquisition and development of public outdoor recreation areas and facilities. Jan./Feb. 1977

"The Floater's Guide"—A comprehensive guide to a favorite pastime in Montana; reprints available. May/June 1977

WATER

"Montana's New Water Law"—What it means to wildlife. Jan./Feb. 1977

"Missouri and Flathead: Free at Last"—Protective federal legislation finally passed. Update, Jan./Feb. 1977

"Monarch of the Yellowstone Basin"—Readers are introduced to a unique 200-year old monument. special Yellowstone issue

"What People Think"—Three researchers examine public opinion on future water use. special Yellowstone issue

"Yellowstone Water: There's Only So Much"—Due to increasing demands on the river, water may become scarce in the Yellowstone Basin if preventive steps are not taken. special Yellowstone issue

"A River Is More Than Water"—The Yellowstone has a giving life and a giving spirit; when will man quit taking more and more? special Yellowstone issue

"Yellowstone Research" — Reports on nine Yellowstone Basin research projects. special Yellowstone issue

"Time for a Decision"—Will the mighty Yellowstone remain free or become just another dammed river? special Yellowstone issue

"Aquatic Research in the Clouds"—Results of a 10-year study of alpine lakes in the Beartooth, Absaroka and Crazy mountains. July/August 1977

"For the Missouri Breaks: A Wild Future"—An historical review of the drive to protect the last remaining undisturbed segment of this great river. July/August 1977

"Big Spring Creek Revisited"—What happens to a stream after channel alteration. July/August 1977

"The Flathead's Future"—The U.S. Army Corps of Engineers is studying several dam sites on the lower Flathead River. Nov./Dec. 1977

"Toxic Algae Invade Hebgen Lake"—What caused a toxic algae bloom that killed dogs and domestic livestock? Catchall, Nov./Dec. 1977

WILDERNESS

"The Rattlesnake: A Chance for Everybody to Win" —A look at a unique wild land in the backyard of one of the state's largest cities. Jan./Feb. 1977

"Absaroka-Beartooth: Whose Right-of-Way?"—Should these two wilderness areas be joined or not? Catchall, Jan./Feb. 1977

"Elkhorns Receive Two-Year Reprieve"—Overwhelming opposition by citizens temporarily halts a destructive plan. Update, Jan./Feb. 1977 ■

Please send gift subscription to:

- ☐ 1 year $3.00
- ☐ 2 years $5.50
- ☐ 3 years $8.00

- ☐ 1 year $3.00
- ☐ 2 years $5.50
- ☐ 3 years $8.00

Name _____

Street _____

City _____ State _____ Zip _____

Name _____

Street _____

City _____ State _____ Zip _____

Add $2 for foreign subscriptions.

MAIL TODAY

JX77

Please affix magazine label or print your own name and address exactly as it appears on the label.

Your Name _____

Street _____

City _____ State _____ Zip _____

Christmas Special

Flip the card for details.

Get Your Montana Wildlife Calendar—FREE!

With a three-year order or renewal, you, the donor, receive a 1978 Montana wildlife calendar. It's bigger and better than ever—featuring 12 of our best wildlife photos, which are also suitable for framing.

ACT TODAY so we'll have time to process your order properly. Please send a check with your gift order; the "bill me later" option is not available for gift subscriptions.

photo: Jon Cates

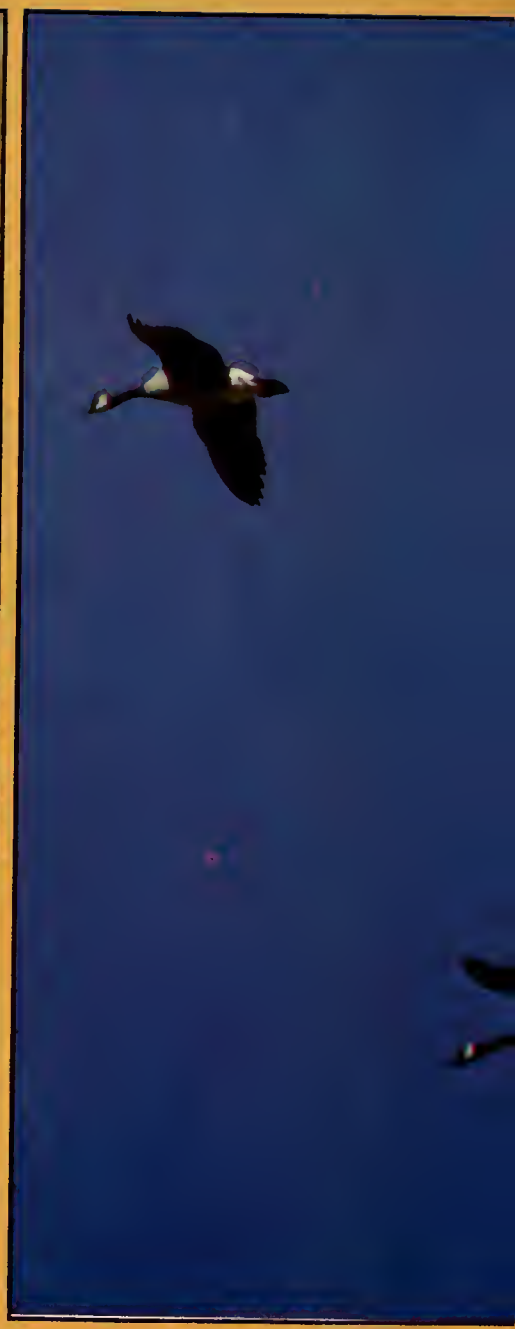
Waterfowl Scenes For Framing

On page 28, Aldo Leopold explains how and why geese have, for centuries, inspired hunters. However, outdoor enthusiasts—hunters and nonhunters—often derive similar pleasure from all waterfowl, not merely geese. So in this installment of our "scenes for framing" series, we're presenting a selection of top waterfowl photos taken by Montana's best wildlife photographers.

In the order they appear in the magazine, the photos include: wood duck (Jon Cates, Route Two; Missoula, MT 59801), redhead (Alan G. Nelson, 36 Devonshire Townhouses; Great Falls, MT 59405), hooded merganser (Nelson), ruddy duck (Nelson), snow goose (Nelson), mallards (Cates), pintail (Lynn Aderhold, Fort Peck Route; Glasgow, MT 59230), common goldeneye (Nelson).

continued

F&G photo: Mike Aderhold



Goose Music

From "A Sand County Almanac with Essays on Conservation from Round River," by Aldo Leopold. Copyright© 1949, 1953, 1966 renewed 1977 by Oxford University Press, Inc. Reprinted by permission.

photo: Jon Cates

SOME YEARS AGO the game of golf was commonly regarded in this country as a kind of social ornament, a pretty diversion for the idle rich, but hardly worthy of the curiosity, much less the serious interest, of men of affairs. Today scores of cities are building municipal golf courses to make golf available to the rank and file of their citizens.

The same change in point of view has occurred toward most other outdoor sports—the frivolities of 50 years ago have become the social necessities of today. But strangely enough, this change is only just beginning to permeate our attitude toward the oldest and most universal of all sports, hunting and fishing.

We have realized dimly, of course, that a day afield was good for the tired businessman. We have also realized that the destruction of wildlife removed the incentive for days afield. But we have not yet learned to express the value of wildlife in terms of social welfare. Some have attempted to justify wildlife conservation in terms of meat, others in terms of personal pleasure, others in terms of cash, still others in the interest of science, education, agriculture, art, public health and even military preparedness. But few have so far clearly realized and expressed the whole truth, namely, that all these things are but factors in a broad social value, and that wildlife, like gold, is a social asset.

But to those whose hearts are stirred by the sound of whistling wings and quacking mallards, wildlife is something even more than this. It is not merely an acquired taste; the instinct that

photo: Jon Cates

finds delight in the sight and pursuit of game is bred into the very fiber of the race. Golf is sophisticated exercise, but the love of hunting is almost a physiological characteristic. A man may not care for golf and still be human, but the man who does not like to see, hunt, photograph or otherwise outwit birds or animals is hardly normal. He is supercivilized, and I for one do not know how to deal with him. Babes do not tremble when they are shown a golf ball, but I should not like to own the boy whose hair does not lift his hat when he sees his first deer. We are dealing, therefore, with something that lies very deep. Some can live without opportunity for the exercise and control of the hunting instinct, just as I suppose some can live without work, play, love, business or other vital adventure. But in these days we regard such deprivations as unsocial. Opportunity for exercise of all the normal instincts has come to be regarded more and more as an inalienable right. The men who are destroying our wildlife are alienating one of these rights and doing a thorough job of it. More than that, they are doing a permanent job of it. When the last corner lot is covered with tenements we can still make a playground by tearing them down, but when the last antelope goes by the board, not all the playground associations in Christendom can do aught to replace the loss.

If wild birds and animals are a social asset, how much of an asset are they? It is easy to say that some of us, afflicted with hereditary hunting fever, cannot live satisfactory lives without them. But this does not establish any comparative value, and in these days it is sometimes necessary to choose between necessities. In short, what is a wild goose worth? I have a ticket to the symphony. It was not cheap. The dollars were well spent, but I would forgo the experience for the sight of the big gander that sailed honking into my decoys at daybreak this morning. It was bitter cold and I was all thumbs, so I blithely missed him. But miss or no miss, I saw him, I heard the wind whistle through his set wings

photo: Danny On

as he came honking out of the gray west, and I felt him so that even now I tingle at the recollection. I doubt not that this very gander has given 10 other men a symphony ticket's worth of thrills.

My notes tell me I have seen a thousand geese this fall. Every one of these in the course of their epic journey from the arctic to the gulf has on one occasion or another probably served man in some equivalent of paid entertainment. One flock perhaps has thrilled a score of schoolboys and sent them scurrying home with tales of high adventure. Another, passing overhead of a dark night, has serenaded a whole city with goose music and awakened who knows what questionings and memories and hopes. A third perhaps has given pause to some farmer at his plow, and brought new thoughts of far lands and journeyings and peoples, where before was only drudgery, barren of any thought at all. I am sure those thousand geese are paying human dividends on a dollar value. Worth in dollars is only an exchange value, like the sale value of a painting or the copyright of a poem. What about

the replacement value? Supposing there were no longer any painting, or poetry or goose music? It is a black thought to dwell upon, but it must be answered. In dire necessity somebody might write another "Iliad," or paint an "Angelus," but fashion a goose? "I, the Lord, will answer them. The hand of the Lord hath done this, and the Holy One of Israel created it."

Is it impious to weigh goose music and art in the same scales? I think not, because the true hunter is merely a noncreative artist. Who painted the first picture on a bone in the caves of France? A hunter. Who alone in our modern life so thrills to the sight of living beauty that he will endure hunger and thirst and cold to feed his eye upon it? The hunter. Who wrote the great hunter's poem about the sheer wonder of the wind, the hail and the snow, the stars

sly arbiter of the classification of human activities, language. If, then, we can live without goose music, we may as well do away with stars, or sunsets, or Iliads. But the point is that we would be fools to do away with any of them.

What value has wildlife from the standpoint of morals and religion? I heard of a boy once who was brought up an atheist. He changed his mind when he saw that there were a hundred-odd species of warblers, each bedecked like to the rainbow and each performing yearly sundry thousands of miles of migration about which scientists wrote wisely but did not understand. No "fortuitous concourse of elements" working blindly through any number of millions of years could quite account for why warblers are so beautiful. No mechanistic theory, even bolstered by mutations, has ever quite answered for the colors

photo: Jon Cates

the lightnings and the clouds, the lion, the deer and the wild goat, the raven, the hawk and the eagle, and above all the eulogy of the horse? Job, one of the great dramatic artists of all time. Poets sing and hunters scale the mountains primarily for one and the same reason—the thrill to beauty. Critics write and hunters outwit their game primarily for one and the same reason—to reduce that beauty to possession. The differences are largely matters of degree, consciousness and that

of the cerulean warbler, or the vespers of the woodthrush, or the swansong, or—goose music.
I dare say this boy's convictions would be harder to shake than those of many inductive theologians. There are yet many boys to be born who, like Isaiah, "may see, and know, and consider, and understand together, that the hand of the Lord hath done this." But where shall they see, and know and consider? In museums?

What is the effect of hunting and fishing on character as compared

photo: Mike Crider

with other outdoor sports? I have already pointed out that the desire lies deeper, that its source is a matter of instinct as well as of competition. A son of a Robinson Crusoe, having never seen a tennis racket, might get along nicely without one, but he would be pretty sure to hunt or fish whether or not he were taught to do so. But this does not establish any superiority as to subjective benefits. Which helps the more to build a man? This question (like the one we used to debate in

F&G photo: Tom Warren

school about whether boys or girls are the best scholars) might be argued till doomsday. I shall not attempt it. But there are two points about hunting that deserve special emphasis. One is that the ethics of sportsmanship is not a fixed code, but must be formulated and practiced by the individual, with no referee but the Almighty. The other is that hunting generally involves the handling of dogs and horses, and the lack of this experience is one of the most serious defects of our gasoline-driven civilization. There was much truth in the old idea that any man ignorant of dogs and horses was not a gentleman. In the West the abuse of horses is still a universal blackball. This rule of thumb was adopted in the cow country long before "character analysis" was invented and, for all we know, may yet outlive it.

But after all, it is poor business to prove that one good thing is better than another. The point is that . . . millions of Americans like to hunt and fish, that the hunting fever is endemic in the race, that the race is benefited by any incentive to get out into the open and is being injured by the destruction of the incentive in this case. To combat this destruction is therefore a social issue.

To conclude: I have congenital hunting fever and three sons. As little tots, they spent their time playing with my decoys and scouring vacant lots with wooden guns. I hope to leave them good health, an education and possibly even a competence. But what are they going to do with these things if there be no more deer in the hills and no more quail in the coverts? No more snipe whistling in the meadow, no more piping of widgeons and chattering of teal as darkness covers the marshes, no more whistling of swift wings when the morning star pales in the east? And when the dawn-wind stirs through the ancient cottonwoods, and the gray light steals down from the hills over the old river sliding softly past its wide brown sandbars—what if there be no more goose music? ■

Don't Miss A Single Issue—Extend Your Subscription To MONTANA OUTDOORS *NOW!*

Name _____

Street _____

City _____ State _____ Zip _____

☐ 1 year $3.00 ☐ check enclosed ☐ new

☐ 2 years $5.50 ☐ bill me later ☐ renewal

☐ 3 years $8.00

☐ check here to order calendar ($2 each)

_____no of calendars

_____amount enclosed

(sorry, no "bill me later" on calendar orders)

JA77

Circulation Director
Montana Outdoors
Montana Dept. of Fish and Game
Helena, MT 59601

Place Stamp Here

Montana Outdoors
Dept. of Fish and Game
Helena, MT 59601

Dear F&G

Challenges Confronting Wildlife Management

The challenges which confront productive wildlife management today are extreme. Population growth, demographic shifts, mobility, increased leisure time and the accessibility of heretofore primitive areas have all resulted in tremendous pressures on our wildlife resources and environment—not just in Montana, but across the nation. This comes at a time of diminishing—or tightened—budgets in state government which all too often frustrate our efforts to meet these challenges in an effective manner.

Over the past several years, I have become deeply disturbed over loss of what might be called "quality" hunting and fishing. It has been a gradual atrophying, and in direct ratio to increased pressures. Admittedly, I may be trying to recall the impossible dream, our outdoor "horn of plenty" during prewar and immediate postwar years. Those days are gone forever. I know it. And you know it. I suppose the impact of this first hit me last fall when fishing the channel between Lewis and Shoshone lakes in Yellowstone National Park. This is a fine stretch of water for spawning brown trout and I had not fished it for nearly a decade. I was dismayed when—after an eight-mile backpack—I discovered myself amongst some two dozen other fishermen, all wading cheek-by-jowl in *my* favorite water. And why not? It's a free country. No man is a dictator over such resources. I was told as much in so many words. And so I should have been.

Nonetheless, we all owe the sportsman his rightful share of available resources. Somehow, we must juggle and juxtapose so that there is enough to go around and still keep a high degree of quality. Those six-pound trout and royal bulls we all dream about—well, we like to hope that there are still enough of them. My suggestions—aimed at just that goal—fall into three categories. I hope you do not feel them presumptuous and I hope these suggestions will not become lost among the others you receive. They are the products of some 30 years of observation, not only in Montana, but in neighboring Wyoming where I was reared. The three categories are: (1) over-hunted resources, (2) sportsman awareness and (3) fisheries management.

Over-hunted resources—As an eyewitness to and participant in several hunting seasons in the Madison Valley, I can assure you this area certainly falls into the category of those subjected to severe pressure. I think last year's diminished hunter-success ratio will bear me out. While weather was a factor, it seemed to me that hunter competition was the key. There is something ludicrous about several thousand resident and nonresident hunters battling to bag what could be no more than several hundred shootable bull elk, the deer notwithstanding. And this is a relatively small area at that.

Certainly, there were far fewer nonresidents due to the dramatic increase in license fees. But is socking it to the nonresident the answer? I am sure that Chamber of Commerce statistics will show that nonresidents spend a good deal more money in our state than do residents, at least during hunting season. Renting cars, accommodations, food, equipment, taxidermy, curios—all must be taken into account. Meanwhile, the more modest rise of in-state fees did little to relieve the pressure.

Why not consider a more equitable apportioning of the hunters themselves? No one that I know wants to see a "draw" system in effect. But there are other alternatives, such as identifying over-hunted areas and charging markedly higher fees to hunt there. The exception would be the resident of that county. But all others—resident and nonresident alike—should be accountable. Perhaps you might consider a trophy fee of, say, $50 for the successful elk hunter in that area and $40 for the person who kills a deer. This would certainly affect the huge number of hunters who annually visit marginal areas. And it seems to me such a system would be better received than a statewide drawing for a specific block.

Sportsman awareness—While not immediately obvious, this factor has a tremendous impact on hunting pressure. It is really very simple. Landowners across the state have denied access to prime hunting areas to sportsmen because of repeated and outrageous behavior of many hunters. What follows, therefore, is a rush—closely resembling a Chinese fire drill—for those few areas with public access. Here, hunters are crowded and game is spooked hither and yon. At such close quarters, accidents are bound to occur, tempers fray and nobody wants to return to his wife empty-handed after all that time and money. As the end of their stay approaches, the hunters' trigger fingers are fidgety.

We all have heard the often-repeated explanation that a few hunters are the ruination of us all. I disagree with this. As a journalist, I have traveled all over the world on various assignments and I have hunted from Africa to Austria. By comparison, I can assure you that the American hunter is the most irresponsible, ill-trained and badly disciplined of them all. Through his lack of awareness and skills, he has singlehandedly shed discredit and embarrassment upon us all. This, in turn, has resulted in a wide variety of repercussions, ranging from a public image slightly less bestial than Adolf Hitler to shrill cries for increased gun controls. He is a pox that has resisted all efforts to redirect behavior.

Little wonder that landowners are reluctant to share his company. After enough livestock has been holed, fences cut, ground littered, game illegally shot and left to rot—who can blame them? And these offenses are repeated year in and year out. Indeed, they are on the increase. I myself witnessed and reported several such violations last fall—and will continue to do so—in the Ennis area. Here, reside outfitters whose trucks have been shot through by panicky clients, ranchers whose houses have been drilled and ordinary folks in the valley who feel it is wise to shoo their children and pets indoors on opening day and keep them there until the war is over. Quite simply: It is a disgrace.

continued

recycled paper

Central European nations like Austria and Germany have managed to maintain their herds and high quality hunting through hunter "quality control." No applicant receives a permit without demonstrating his abilities via a rigorous test. This includes trail craft, game identification and marksmanship, as well as judgment. Our hunter safety program is a farce—at least by comparison.

Why not consider such a program on a test basis, administered by the National Rifle Assn. (NRA) and directed by the state fish and game departments? Of primary concern is hunter judgment and trail craft. Those who complete the examination successfully might be issued a card which would then be presented to landowners. Ultimately, hunters should be licensed no less stringently than drivers. It would seem to me that the NRA, seeking to improve its own image, would certainly consider assisting the program.

Nobody likes rules and regulations. It is not the American way, nor is it the way of the West. But I can assure you that unless small steps are taken today, greater ones will be necessary tomorrow. It's time to bite the bullet. And Montana is in a position to serve as both an example and a leader to the rest of the nation.

And by the way, can't we get rid of "trail bikes"? Somehow, we hunters managed to survive the wilds without them for years. If somebody feels he must use a machine instead of a horse or his own two feet to get his game, he is not a hunter. The elimination of such devices would cull out further numbers of hunters and restore the word "primitive" to some of our mountains and forests. Try to explain the use of such trail bikes to a professional hunter in Africa or to an Austrian game master. It is somewhat embarrassing.

Fisheries management—Each summer I have looked on as a growing flotilla of boats is daily launched on the lower Madison, one of our blue ribbon streams and some of the finest trout fishing water in the world. This armada—some vessels from as far away as Island Park, Idaho; Billings, Great Falls and Bozeman—proceeds down the river speedily snaking out brood stock trout from behind and alongside midstream rocks. Now it is a fact that the Madison's trophy, or "quality," fish prefer midstream haunts. That is the rule, except for the salmon fly hatch in July and in the fall when large trout can be found chasing sculpins in the shallows. For the most part, these trout—now all too accessible—are rarely returned. The result is predictable. Trophy trout fishing on heavily floated waters is on the decrease. Worse, these larger trout are brood stock fish whose absence is sorely missed.

Presently Ennis outfitters, for example, estimate there are no fewer than 50 boats on the lower Madison every day. True, the floatable sections are alternated each year. But with the increase in pressure, even this system is not enough. There are several alternatives short of limiting the number of floaters. Here are a few:

(1) Limit floaters to fly fishing only. Most fly fishermen are prone to releasing trout. But the bait fishermen and spin fishermen using more than one hook would have trouble releasing a fish even if they wanted to (which most do not).

(2) Restrict float fishing to single hooks only.

(3) Limit each boat to only one fish over 16 inches long. Yellowstone park fisheries biologists have employed a similar program in and around Yellowstone Lake where there had been a dramatic decrease of larger cutthroats and a corresponding increase of trash fish upon which they prey. While it is still too early to pinpoint results, the program shows dramatic promise.

(4) Limit floaters to "catch and release" fishing only.

Montana biologists have decided that "stocking" is generally unproductive in many waters and may be, in fact, harmful to native trout. I agree with them. However, unless steps are taken to protect the supply of larger fish in rivers like the Jefferson, Madison and Big Hole, there may be no alternative other than posting some waters as totally "catch and release." Somewhat ashamedly, I admit I like to keep a fish now and then. I think most of us do.

Too, I am aware that some biologists and outfitters claim that fishing has never been better in the lower Madison, for example. But men like West Yellowstone's Pat Barnes who have fished the river for nearly 50 years know better. And so do I. But let's assume they are right and we are wrong. Adopting a new approach would make fishing even more productive, wouldn't it?

What we have is priceless. Once gone, it is impossible to replace. Let's swallow a little bitter medicine now. Tomorrow, we may have to drink the whole bottle.—*Nathan Miller Adams; Pleasantville, N.Y.*

Wildlife Shorts

All of Montana's seven species of hummingbirds migrate out of the state for the long winter.

*****

Owls have the most acute night vision of all birds. They can swoop down on targets in an illumination of only .00000073 of a foot-candle. This is equivalent to the light from a candle lit 390 yards away. This visual acuity is 50 times greater than human night vision.

*****

Of living birds, the ostrich produces the largest egg—up to 6-7 inches in length and 4-6 inches in diameter.

*****

The largest recorded live weight for a turkey was 64 pounds. It was raised in California in 1962.

*****

The longest lived animal is the tortoise—up to 116 years.

Montana has 101 mammals. Two of these are endangered—the black-footed ferret and the northern Rocky Mountain wolf.

*****

Montana has 10 types of snakes, but only one is poisonous—the prairie rattlesnake.

*****

The largest bird of prey in Montana is the golden eagle. It has a wing span of 6-6½ feet and weighs from 9-12 pounds.

*****

Montana is one of the few places in the world where there are frogs with tails. The tailed frog is the most primitive species of American frog.

*****

The largest fresh-water fish ever recorded is the giant Russian sturgeon. It measured 26 feet in length and weighed 3,221 pounds.—*Vince Yannone*

Carry a Trash Bag

The landowner has the greatest respect for his land. The outdoor recreationist should show this same respect by removing his or her or any other trash. This small token of gratitude, although a nuisance to the recreationist, *could* go a long way or nowhere at all toward helping user/landowner relationships. If every recreationist, fisherman or hunter who used private land carried one or more trash bags and filled them with the trash he came across while on that land, we would have many pleased landowners. If only half the users did this, we would have fewer pleased landowners. If only one-fourth helped clean up the land they were using, we would have even fewer pleased landowners.

I'm a user and whether I'm on private or public land, and whether it's a nuisance or not, I'll be carrying a trash bag. It will go in empty and come out full. If *you* help, we can reduce the amount of litter and improve our relationships with the landowner.—*Ron Paulick; Billings, Mont.*

Enchanting Creek Music

The following is a short account about what I experienced one afternoon in a newly proposed wilderness area near Missoula, Welcome Creek.

Maybe if a few more eyes were opened about what one can find in the wilderness, the priceless feeling of renewing one's bonds with nature and escaping the hustle of our society, then maybe this beautiful creek would be made wilderness and hold these same sights and experiences for our children to enjoy.—*Tim Stevenson, age 18; Missoula, Mont.*

Welcome Creek Wilderness

Last spring I had the opportunity to hike into the newly proposed wilderness, Welcome Creek, situated about 17 miles up the blue ribbon fishing stream known commonly to the anglers of western Montana as Rock Creek.

As you cross the swinging footbridge, a roaring Rock Creek pushes a breeze of fresh mountain air past you. Ahead lies a trail leading into a forest of giant ponderosa and strange rock outcroppings. As you follow the trail, it leads you up a gentle, rising valley. If you look to the side, you notice the endless rock slides reaching up to a clear, blue sky where a pair of red-tailed hawks play with the currents. You realize how the creek got its name as you look to the other side. It beckons you to stop and sit by its side and watch the crystal clear water bubble and splash as it is escorted down the valley by old larch and young spruce.

As I closed my eyes, I imagined what the first old prospector must have felt being the first person into this country, with the chance of striking big just around the bend or maybe in that pool right up there. I soon forgot about the gold as the beauty of the land around me filled not only my gold pouch but my heart, too. So I built a cabin in a quiet meadow and made my life fit the land, hunting and trapping what I needed.

I was soon brought back to reality as I heard a supersonic jet roaring from one crowded city to another, flying high above me and my dreams. As I headed back across the footbridge, I noticed the crowded campground full of tourists and their six-wheeled travel homes. The sounds and the dust from the traffic took away the enchanting creek music and the beautiful aroma of plants and pine.

Upon reaching the other side, I turned to take one last look to last me until I returned. I swore I saw an old man dressed like an old-time prospector turn and wave as the shadows engulfed him and he faded into the darkness of night.

Eradicate the Grizzly?

I've read with interest several pro-grizzly letters by readers of your magazine.One person, who obviously has very little knowledge of past history, wrote that it was "inconsistent with God's teachings" for the grizzly bear to be "put on earth" only to be "killed off." Later on in the letter, the writer had the audacity to suggest that "sound logic" was needed in considering the bear problem.

Another person suggests that problem bears be transplanted to an area where there are no grizzlies at present. I disagree completely with this "solution." I think problem bears (bears that chase people or hang around campgrounds) should be either destroyed or captured and placed in a zoo. These bears are potential killers and drastic action must be taken against them. Transplanting these bears is almost a criminal act, since grizzlies can travel great distances and who knows where they will end up. I suggest that we have been a little too tolerant of the grizzly. As for the grizzly becoming tolerant of man, I think the recent past has shown that when this occurs, some grizzlies begin to look upon man as a potential source of protein.

I realize I am going to anger a lot of people, especially those who tend to anthropomorphize animals, but it wouldn't bother me even a little bit to see the grizzly eradicated. A great many species of animals have become extinct in the past because their time had come. In most cases, it was a natural occurrence, occurring within nature, not a "crime against nature."

In addition, the author of a pro-grizzly letter in your July/August 1977 issue makes a rather dubious statement—that elk and deer provide an important source of protein for bears in all seasons of the year. I know this isn't true for the winter months because the grizzly is in a state of semi-hibernation. I would question the validity of the statement for the remaining seasons also, with the possible exception of spring when bears may feed on winter-killed animals (if the coyotes and ravens have left any).—*Roger Stang; Superior, Mont.*

Missouri Breaks Article Praised

I have just seen my first issue of *Montana Outdoors* (July/August 1977) and was very favorably impressed with the integrity of its reporting. The Fish and Game Commission and all concerned are to be congratulated. Ken Walcheck's article on the Missouri Breaks is an example of such reporting, a very fine example.

I was privileged to float the breaks in 1962, as part of a group organized and led by a theater owner from Havre, Emil DonTigny. As I understood the situation at the time, Mr. DonTigny was, at that early date, making a pioneer effort to save the breaks. One of his tactics was to take as many people on the river as he could, to make them aware and concerned.

Since Mr. Walcheck gives credit in his article to a significant number of breaks activists, I thought perhaps this additional name should be mentioned.—*Thomas Tanner, Dept. of Environmental Studies, Iowa State University; Ames, Iowa*

Carefully Consider Wildlife

Regarding the reprint, "Anti-Hunting: A Wasteful Issue," by Ed Kozicky and John Madson in your July/August 1977 magazine, I do not

think that perception or outdoor mileage has much to do with the gap between hunter and anti-hunter. There are plenty of conservationist outdoorsmen and outdoorswomen who have perceptions probably far beyond the general run of hunter, and certainly beyond those so-called hunters who hardly know one end of a gun from another or bother to look at what they are shooting at. Many licensed butchers enter the forest every year—in one hunting season (1971) in my home state of Wisconsin, six hunters were shot by others, and one man shot and killed his own son.

Admittedly, many of these hunters were from large cities or out of state and had little experience with safety or with forest ways and trails. Perhaps the problem here is that unskilled and foolish people are issued licenses to enter our wild lands and maim and destroy whatever they aim at—whether it is deer, cow or people. None of us need meat that badly.

As to the writers' other arguments in favor of "sport" hunting, I see no quarrel with hunting for necessity (particularly for native Americans who may need the meat), but for the other avid bloodletters who stalk the frightened animal, I see no wonderful free, basic, right form of happiness. It is not confusing to wish for careful conservation of wildlife, but it is confusing to call such killing "sport," for it is neither sporting, fair nor amusing to kill a gentle thing.—*Theo Jonkel; San Francisco, Calif.*

Mountain Called "Manhead"

I would like to comment on the letter in your wonderful magazine, in the Sept./Oct. 1977 issue, written by Art Mattila of Florence, Mont. The letter was headlined "Montana's Mount Rushmore."

This is not to criticize Mr. Mattila; he seems to love the mountains as well as I. I write for the Madisonian and Jefferson Valley News under the by-line, "Driftwood from the Jefferson." My stationery has a sketch of the Tobacco Root Range and Manhead Mountain. I am an amateur photographer and one of my best shots is a photo of Manhead Mountain. The mountain is 8,893 feet high and is situated at the north end of the Tobacco Roots. The Deerlodge National Forest (Jefferson Ranger District) map gives the official name of this mountain as "Dead Mountain." I have lived in the Jefferson River Valley for most of my 75 years and I have never heard it called "Man-Faced Mountain," as Mr. Mattila calls it. The most used name is Manhead Mountain.

The Big Sky Country is beautiful and I would not care to live in any other state. I have seen a lot of Montana with rod, reel and rifle.—*Hugh D. Mosier; Whitehall, Mont.*

Contributors

Since 1958, over 70% of Montana's resident hunters have completed the department's hunter education course. Graduates have received training in proper hunting ethics, safe handling of firearms, wildlife management, landowner/recreationist relations, game identification, wilderness survival, fire building, compass reading and care of game meat. As **Jim Ramsey** points out in his article, "Hunter Education," this has gone "a long way toward making a great sport safer and hunters more responsible." For more details about this department project, turn to page 2. Ramsey is the training officer for the department's Enforcement Division. He previously worked on game farms and has been employed by the department for nearly 30 years.

The Welcome Wagon committee didn't meet the 350-pound python and several of its relatives when they moved to Rock Creek Lodge, 25 miles east of Missoula. As a matter of fact, the opening of the Snake Pit at the mouth of one of Montana's blue ribbon trout streams—Rock Creek—dismayed many Montanans. **Glenn Oakley** looks at the situation and examines the Snake Pit's effects on the area. A former *Montana Outdoors* intern, Oakley is completing work on his B.A. in journalism at the University of Montana, Missoula. He has worked for the Student Action Center and was named student representative to the Flathead Coalition. Turn to page 12 for a peek at "Montana's First Snake Pit."

The lower Flathead—a ribbon of blue, flanked by rows of green pines; the river winding its way through a wild, dry land, the water clear and blue-green all the way to the rocky bottom. But this wild river is in danger of impoundment. Six potential dam sites are under consideration by the U.S. Army Corps of Engineers. By the end of this year or early in 1978, the corps will select the most favorable sites for further study. For a view of the river and a chance to hear what some area residents have to say about the proposed developments, turn to **Bert Lindler's** article, "The Flathead's Future," on page 39. A reporter/photographer for the Great Falls Tribune, Lindler previously worked as a technical writer for the U.S. Forest Service in Missoula. He holds a B.A. in philosophy from the College of William and Mary in Williamsburg, Va. and an M.S. in journalism/science writing from the University of Missouri.

Assigning a dollar value to timber or minerals isn't very difficult—there is a market for these resources and buyers pay a specific price. However, when the question is, "How Much Is Wildlife Worth?", the answer isn't simple. First, the value of items sold in the marketplace is easily measured, with money as the common denominator. But resources that aren't marketed in the traditional sense—such as wildlife—are described in user-days and prose. As **Terry Lonner** and **Verne House** point out in their article on page 46, such a situation hardly facilitates rational comparison. Lonner is a research biologist with the department, working at the Research Bureau in Bozeman. He was responsible for a section of the Montana Cooperative Elk-Logging Study and is a member of the research committee for the study's statewide efforts. He holds B.S. and M.S. degrees in fish and wildlife management, both from Montana State University, Bozeman. House is a public affairs specialist with the Cooperative Extension Service and an associate professor in the Dept. of Agricultural Economics and Economics at MSU. He holds B.S. and M.S. degrees in agricultural economics from the University of Wyoming, Laramie. He earned his Ph.D., also in agricultural economics, from Washington State University, Pullman.

The Flathead's Future

Will somebody pay $2 million per year to keep it free flowing?

by Bert Lindler

AN ELECTRIC WHINE filled the air. Below, buried in tunnels beneath the jagged cliffs, turbines spun, driven into a whirling frenzy by the power of falling water.

House lights flashed on hundreds of miles away, elements in ovens turned red hot, spotlights illuminated operating tables. But here, there was only a whine, the unrelenting cry of a river held hostage.

continued

Will the lower Flathead River become a series of reservoirs? photo: Rick Trembath

"See magnificent Kerr Dam. Higher than Niagara," says the sign in Polson. The canyon is magnificent. Its towering sides dwarf the dam, 204 feet high. Here the canyon seems less than a river wide, but before the dam was constructed, the entire river found its way around the S-curve worn through the rocky cliffs.

Now, water moves sluggishly below the dam in green pools. The only flowing water squirts through leaks in the gates on top of the dam and cascades into the canyon.

Below the S-curve, the turbines release the river, its ransom paid. Bolting for the Columbia, the river boils out of the power plant and crashes into the rocky bed below. The river surges and froths, kicking itself into waves and swirling itself into suck holes until it has beaten its way past Buffalo Rapids, making good its escape.

From here, the river is a ribbon of blue, flanked by rows of green pines. As it winds its way through a wild, dry land, the water is clear, blue-green all the way to the rocky bottom.

The river flows wide and slow from Buffalo Rapids Bridge, occasionally constricting or shallowing into rapids and riffles. Mud cliffs, carved into miniature mountain ranges by wind and rain, line the banks. Against the cliffs swallows flit, sometimes slipping into their adobe homes against the cliffs, or streaking out, dipping, darting and diving in pursuit of insects.

Where the banks run down the river, ponderosa pine and cedar form green belts of shade. Cattle loll in the dusty hollows they've worn beneath the trees. Far above, in hollowed-out bowls of sticks, nest eagles, ospreys and hawks. Nearby, the cobblestones of a rocky beach bake in the noonday sun. Mud, deposited during the spring run-off, curls and cracks away from the rocky surface like a weathered layer of paint.

Between the rocks, the river's garden grows. Composites, every petal a flower, cast yellow and purple hues. Tiny white blossoms cluster in the leaf axils of a mint. Behind the native plants, willow shoots sprout. Few grow more than a foot or two before a beaver snips them off, pruning its willows the way a suburbanite tends his hedge. The stumps sprout new shoots, providing more meals a couple of years down the line.

Further down river, the weathered skeleton of a house stands proudly on the knoll above Horseshoe Bend. Inside, below the window ledges, piles of guano are mounded, proof that swallows, pigeons or owls appreciate a perch with a view.

The windows look out over rolling brown hills, cobbled gray beaches and sweeps of water. Imagine the former inhabitants, their elbows propped on the sill, heads resting on their hands, looking out at the land, their land. Were there three children—two boys and a girl? Did they go to school? Had the family laid away enough provender by the time waterfowl massed on the river? What forced them to leave this citadel, the most beautiful on the river?

Years back, every 160 acres of this land was homesteaded. The hopefuls came with their wagons, their tools and their dreams. Rock fences, waist-high and two feet across, mark the boundaries of their land. Apple trees, gone wild but still productive, dot the landscape. Root cellars, house foundations and piled rocks remain, but the land has shaken off the unwanted inhabitants.

At the turnoff to Kerr Dam, eight miles from Polson, the stripe down the middle of the road ends. A few miles further, the pavement thins to dirt. Then, there are just dirt roads, a maze of them, traveling straight then crooking 90 degrees down section lines. The roads travel through irrigated fields of hay, barley, oats and potatoes, occasionally giving way to an isolated farmhouse.

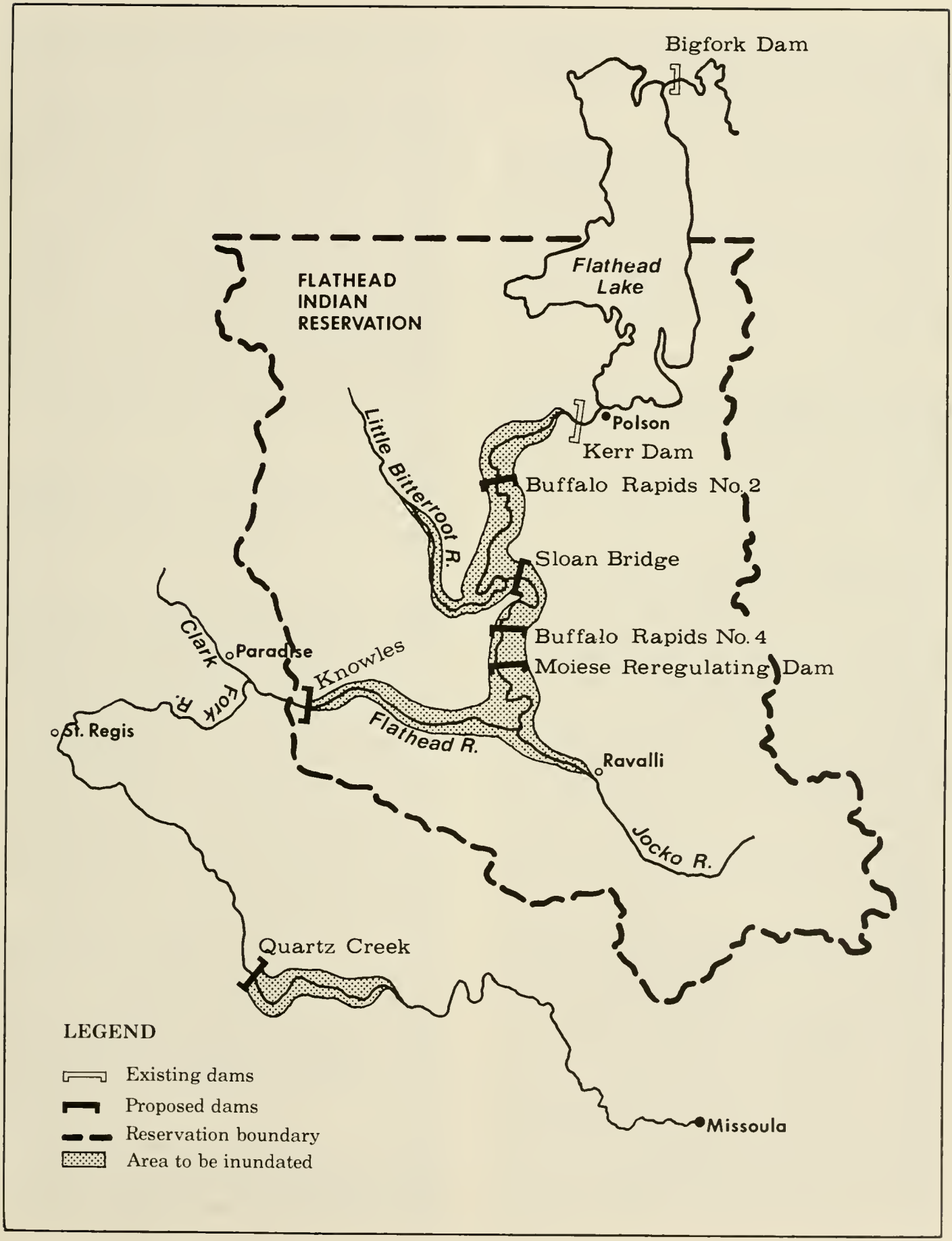
Few evidences of man's habitation are visible from the more than 40 miles of river between Kerr Dam and Dixon. Even the land beyond the river is only lightly developed. Below Dixon, the river parallels Montana Highway 200, joining the muddy waters of the Clark Fork just above Paradise.

Now, this wild river is in danger of impoundment. Six potential dam sites on the lower Flathead River and one on the Clark Fork are under consideration in the $1 million Flathead-Clark Fork River Basin Hydropower Study, the U.S. Army Corps of Engineers' only study of new hydroelectric dam sites in the Pacific Northwest. By late 1977, or early 1978, the corps will select the most favorable of these sites for more detailed study.

The Flathead River already makes a significant contribution to the Pacific Northwest's power supply. Kerr Dam, constructed about eight miles below Flathead Lake in 1938 by The Montana Power Co. (MPC), can produce 180 megawatts of power, almost one-seventh of MPC's total electrical supply capability. Hungry Horse Dam, constructed by the Bureau of Reclamation in 1953 above Flathead Lake on the South Fork of the Flathead River, has the capacity to produce 285 megawatts of power. Construction of additional dams on the Flathead River above Flathead Lake was discouraged by designation of portions of the North, South and Middle forks of the Flathead River as wild, scenic and recreational rivers in 1976.

THE MEN WHO LIVE in the wild country of the lower Flathead, who have farmed and ranched there all their lives, have little enthusiasm for the corps' studies.

High on a dusty knoll overlooking his ranch buildings and irrigated fields, Carl Moss has built a stone memorial to his father: "Reuben R. Moss, 1905-1976, a good man," the bronze plaque reads. The father used to sit here and gaze at the productive land he had worked so long. His eyes would sweep from the ranch buildings snuggled along the river to


Bigfork Dam
FLATHEAD INDIAN RESERVATION
Flathead Lake
Polson
Kerr Dam
Little Bitterroot R.
Buffalo Rapids No. 2
Sloan Bridge
Buffalo Rapids No. 4
Moiese Reregulating Dam
Clark Fork R.
Paradise
Knowles
St. Regis
Flathead R.
Ravalli
Jocko R.
Quartz Creek
Missoula
LEGEND
Existing dams
Proposed dams
Reservation boundary
Area to be inundated

the hay, grain and corn fields in the valley bottom. Above the fields were the grassy hillsides and timbered ridges of Fairy Basin where his horses and cattle grazed. Across the river were the productive farm lands of the Moiese Valley.

"If Knowles Dam were constructed, the water would come to this memorial," the son told me. "We would lose all our productive land. Sometime they're just going to have to figure out where to put these dams. They just can't afford to take these big areas of productive land out of production. I've been in agriculture all my life. I know how expensive it is to take care of one of these pieces of ground. The cost of putting a new piece of ground into production is almost prohibitive. They should protect the productive lands."

"...The Indians have a reverence for the river. 'When they want to go there and camp by it or pray in sweathouses beside it or fish in it, they want it to be there. It gives them a sense of stability'."

Everitt Foust, who raises certified seed potatoes, silage corn, barley, oats and beef cattle on 850 acres of irrigated land bordering the river in the Moiese Valley, has been fighting dams on the lower Flathead River since 1948. Then, Paradise Dam, which would have flooded the lower Flathead and Clark Fork rivers, was under consideration. Property values in the valley plummeted.

When the corps began its latest round of studies, landowners in the Moiese Valley banded together to protect their property values. The landowners said they would permit the corps to cross their lands to conduct studies only if the corps agreed to compensate persons forced to sell at reduced property values. The corps, which would not make such an agreement, conducted its studies on tribal land and on the land of property owners who granted access without the stipulation.

If Knowles Dam or the reregulating dam at Moiese were built, Foust would be flooded out. He doesn't know where he would be able to resettle. He doesn't want to move. "I've never felt Paradise or Knowles or the high dams would be any benefit to Montana," he said. "Washington and Oregon would be the beneficiary. Montana's already sacrificed a lot of her resources to people outside the state."

Walt Vermedahl ranches near the Buffalo Rapids Bridge, site of one of the proposed dams, just three miles from the farm where he was born. When he was a kid, the hills, coulees and flats near here were his playpen. Now, they're his livelihood.

The land he ranches hasn't changed in the 40 years he's been riding across it, Vermedahl says. He doesn't want to see the country inundated by dams that would expose large mud flats one day and cover them the next, but he supports construction of the run-of-the-river dams, which would maintain a nearly constant pool.

At public hearings in Missoula and Polson last spring, the corps' study met considerable opposition. In Missoula, most of 200 persons attending raised their hands opposing construction of any dams. The Flathead Chapter of the Audubon Society voted unanimously to oppose construction of the dams.

However, some persons who oppose construction of the largest of the proposed dams reluctantly support construction of Buffalo Rapids No. 2 and No. 4, which would create long, narrow reservoirs that would be maintained at a nearly constant pool.

These two dams, one to be constructed 12 miles below Kerr Dam at Buffalo Rapids Bridge and another below Sloan Bridge 24 miles further downstream, would form a lake 36 miles long, inundating 6,700 acres of land. The two dams would produce an estimated 131 megawatts of power annually.

MPC offered to build these two dams last spring. The company offered to pay the Confederated Salish and Kootenai Tribes $500,000 annually for rental of the dam sites. The tribal council rejected the offer.

BIOLOGISTS HAVE little information on the fisheries and wildlife values on the lower Flathead, said Joe Huston, a fisheries and wildlife biologist for the Dept. of Fish and Game in Kalispell. The river now supports populations of brown, rainbow and cutthroat trout, Dolly Varden, whitefish and northern pike, which entered the drainage from Lone Pine Reservoir. However, two run-of-the-river dams on the Clark Fork River below its confluence with the Flathead support only marginal fisheries. The water temperatures in Cabinet Gorge and Noxon dams are above the optimum for trout, Huston said. If run-of-the-river dams are constructed on the lower Flathead, water temperatures may go even higher. High dams, which would allow the release of cool water, might improve fishing downstream.

Waterfowl nesting is the wildlife resource most likely to be affected by construction of the dams, Huston said. The lower Flathead produces both ducks and geese. Some of the best nesting sites may be flooded by the proposed reservoirs.

Additional information may be provided by Janet Smith, a biologist working for the Bureau of Sport Fisheries and Wildlife in Billings. She will conduct a two-year study of fish and wildlife resources on the lower Flathead. The $60,000 study will be funded by the corps.

During a two-day float from Buffalo Rapids Bridge to Dixon last spring, the Flathead Chapter of the Audubon Society identified 72 species of birds, including hawks, ospreys, golden eagles, whistling swans and Canada geese. If dams were constructed,

30 species that nest in dead trees, on islands and on the mud cliffs lining the river would be affected, according to the chapter's study.

The diverse bird life found along the river is due to the diverse habitat. At the river's edge, semi-arid prairie meets a lusher river bottom habitat containing mud cliffs, forest thickets, islands and flood plain. A reservoir would not provide such diverse habitat, the study said.

The Wilderness Institute of the University of Montana School of Forestry in Missoula is conducting studies on the recreational use of the river. Preliminary estimates of a recreation survey indicate about 20 persons per day use the river from Buffalo Rapids Bridge to Perma. Most persons fish, swim, picnic or canoe. Additional study will determine if the economic value of recreation on the proposed reservoirs will exceed the value of present recreational use of the river. There are already seven reservoirs in the area, in addition to Flathead Lake.

The tribal council has given the corps permission to study the dam sites, but has not committed itself to construction of any dams, said Harold Mitchell, Jr., chairman. In fact, the council mailed a memorandum to the corps April 22, 1977 titled, "Tribal ownership and control over the licensing and relicensing of power sites on the Flathead Indian Reservation, Montana." The memorandum stated, "Obviously tribal ownership puts these sites outside the ambit of normal consideration for public power development and this fact must be addressed in the corps' study."

Louis Adams, tribal council member, opposes construction of any of the dams. "All this means progress," he said. "I know what progress has done to our people in the past. I want things left as they are."

Doug Allard, a member of the tribe and owner of an Indian museum in St. Ignatius, said the Indians have a reverence for the river. "When they want to go there and camp by it or pray in sweathouses beside it or fish in it, they want it to be there. It gives them a sense of stability. I have yet to talk to one of the old bloods who wants the dams built. The old people, who are real poor, they don't want to sell the river."

However, Allard said, there will be no demonstration to save the river. It's not the Indian way. "The Indian way is to be quiet and pray. Things will go their own way," he said.

Historically, the Flatheads have not only revered the river, they have feared it, said Larry Parker, a tribal member who teaches the Salish language in the Ronan schools. Years ago, the river was feared, he said, for it was the home of the Flathead Lake monster, a creature similar to the Loch Ness monster. The Flathead Lake monster was seen many times by his people, he said.

Economic benefits of constructing the dams will be a lure too strong to resist, predicted Thurman Trosper, a member of the tribe and past president of The Wilderness Society. "The Indians appreciate beauty more than the average white man," he said, "but they have to eat too. If you could find somebody willing to pay $1.5 million to $2 million a year to keep the river free flowing, I'm sure I could sell that to the tribal council."

* * * * *

YEARS AGO, according to Flathead tribal legend, the Flathead Valley flooded, drowning nearly all the inhabitants. As the survivors fled to higher ground, the waters followed them.

Finally, all the land was covered except for one peak where a small band of Indians huddled. The chief said, "I will try to stop the water. I will ask my guardian spirit to help me."

He shot an arrow toward the ground at the edge of the water, but the arrow floated away, as did a second. The third arrow stayed in the ground at the very edge of the waves. The water reached the fletching (feathers), but went no higher. Gradually, the water receded, exposing the mountains, hills and valleys. The water that remained formed Flathead Lake.

I pondered the significance of the legend as I sat on the rocky hillside above Kerr Dam. The first orange rays of sun burned the brown hills opposite my perch, as I easily drifted into a daydream. While I gazed sleepily into the darkened canyon, I saw the river grow quiet. The white-spiked waves flattened. The green spires of shore line ponderosa pine were inundated by the rising waters.

The clatter of jackhammers assaulted my ears. Roads, cabins, marinas, bridges and dams were springing up on a dry land formerly peopled only by dirt roads, farm houses and wild creatures.

I stood in terror, praying for my guardian spirit to help me. I fired an arrow toward the edge of the water, but it clattered against the canyon wall and broke into tiny pieces. I fired a second arrow, which landed firm along the bank, but floated away with the rising waters.

Before I could fire a third time, the surface of the lake boiled. From the depths arose an enormous creature, too beautiful to be a monster. Its neck was long and slender and its powerful tail fanned gracefully, propelling the creature slowly across the lake. Its scales glistened like silver dollars. Its smoothly arched back and neck were George Washington green. In its head, the haunting eyes glowed like precious rubies.

I was filled with hatred for this beautiful creature. I raised the bow and nocked my third arrow. The shot was good. The arrow sank to the fletching beneath the silver scales.

The water erupted as the huge creature thrashed in the throes of death. Its enormous tail swept back and forth, sending towering waves of water over the cliffs and flooding nearby fields. I ran for high ground.

When I awoke, exhausted and drenched with perspiration, I saw only the river in the canyon below.■

Editorial

Sportsmen, Choose Your Path

Hunting is not a right; it's a privilege—and an unappreciated privilege can be lost.

No passages in the U.S. Constitution or scribbled fragments in the Bill of Rights say, "You shalt have the right to hunt." No state in the Union guarantees its citizens a "right" to hunt. Even though hunting may have been phased out as the only way to obtain meat, it has continued as a ritual, a tradition, a method of sidling up to nature's ways.

Since stalking wild game is a privilege, you can lose that privilege. Bridges of understanding must be built with landowners. Hunting behavior afield must be unquestionably correct and law abiding. Hunters must police their own ranks and rid themselves of the careless, callous and uncompromising "slob" hunter.

In the end, either sportsmen will deserve their hunting privilege, or lose it because they don't. Only hunters can save hunting. If they don't clean up their act, our hunting future is already behind us.

Montana sells about 1,050,000 hunting and fishing licenses of all types each year. Residents buy about 745,000; nonresidents pay for 305,000 — one-third of which are one-day fishing permits. With that number of feet treading on public and private land each year, some paths are bound to lead to trouble.

Perhaps some problems are minor, with no malicious forethought. Some game law violations are accidental; like the two antelope dropped with one shot. But other crimes are hard-core—cutting through a landowner's fence because there's no nearby gate, or shooting a bull, cow and calf moose and leaving them to rot. However vicious the violation, sportsmen must now begin to band together and say, "Enough. We can't take it any longer. You who are inconsiderate may ruin it for us all." Anyone who deserves the name "sportsman" must surely feel this way.

If your outdoor partner takes more fish than the limit, shoots too many ducks or thinks poaching might be okay, it's your duty to call him on it and say you don't approve. If others drive off established roads and trails, note vehicle license numbers, vehicle description, location, time of day and details about what you saw. Then, report the information to a game warden. Passing the buck or hoping someone else will enforce the laws may endanger your future hunting. Enforcing laws and coming down every time on the side of regulations and common sense must start in each hunter's conscience.

Montana comprises about 150,000 square miles of land and water surface. About 80 fish and game wardens could be in the field at any one time, including two federal wardens assigned to Montana. That gives each person over 1,800 square miles to police. That works out to about one county per person. (For example, Yellowstone County contains 2,600 square miles of land and water.) Doubling the number of wardens would still mean 900 square miles for one person to cover. An effective network of hunters giving wardens leads could greatly assist in obtaining a satisfactory level of compliance with

fish and game laws. For example, wardens receive some tips from concerned sportsmen who see violations and record useful information: time, place, vehicle license number, etc. But there must be more of these helpful phone calls from sportsmen who observe violations.

Toward this goal, the Billings Rod & Gun Club has started its own reward program. Anyone offering information leading to a conviction for killing domestic stock receives a sportsman-financed reward of $500. Convictions related to vandalism on ranches and other private land yield $100. This is one effort by a sportsmen's group to cleanse the flock. At the same time, the group hopes to improve landowner/recreationist relations.

In areas where private lands form the base for hunting, sportsmen have to work with and help landowners. Each year, many ranchers spend much of the hunting season processing hunters through their property, picking up after them when they leave and trying to police them while they are there.

Some hunters know what they are doing when they take to the woods and plains. Others don't. The latter group needs training.

All states have hunter education courses. In Montana, the courses are taught by volunteers. Students range from 12-18 years old. Many adult hunters have never had hunter education, and many need it. Just brushing up against the "good manners afield" section of the course would benefit many. Perhaps hunter training will become mandatory—if that's what it takes to rid the hunting fraternity of its bad actors. (See Jim Ramsey's article on hunter education, starting on page 2.)

Studies in Michigan, Utah and other states list the hunter's attitude as he pursues his sport as the most objectionable aspect of hunting. Included as objectionable are disrespecting the land hunted on, failing to abide by game laws and limits (with poaching mentioned frequently) and knowing little about the animals pursued. Anti-hunting groups appeal to emotions. And there's no doubt that "slob" hunters who engage in objectionable activities aggravate an already emotionally charged situation. The anti-hunting groups seem to be effective and their ranks are growing. Perish the thought, but some day in a hunt referendum (or a no-hunt referendum), anti-hunters could carry the day.

The Alaska Dept. of Fish and Game recently wanted to cull wolves which it believed were harming moose populations. The department intended to use aerial gunning. This game management project was overruled by public opinion incited by anti-hunting sentiment.

Burros in the Grand Canyon have been in the news because they are eating forage needed by desert bighorn sheep. The Dept. of the Interior wanted to eliminate the burros, but an incensed public intervened.

Montana now has a limit of 25 grizzly bears which can be killed annually by any means, hunting or nonhunting. The grizzly is classified as "threatened" due to pressure from people around the country who do not understand that Montana feels it has an adequate bear management program.

There are many other examples. But it all comes down to the fact that the hunter is the key to his own future. He must realize the odds stacked against him, work to get along with landowners, cull the "slob" from his ranks and present his case as a useful part of game management.

One country has outlawed hunting because it could not control the sport. On May 19, 1977, Kenya's minister of tourism and wildlife, Matthew J. Ogutu, announced the east African country had banned big game hunting within its borders, effective immediately. Professional hunters and companies were ordered to turn hunting safaris into photographic excursions. The sad tale is they could not control poaching, which is in the vanguard of reasons to stop hunting worldwide. Kenya will lose millions of sportsmen's dollars—many of which were used to pay for research to preserve Kenya's wildlife. Without hunters, wildlife is the loser.

Some of our so-called "sportsmen" are clearly not law abiding. A press release written by Associated Press in Denver, noted that on Memorial Day 1977, Canadian and U.S. authorities checked 500 returning U.S. fishermen. They found over 100 of them bringing back illegally acquired fish and exceeding Canadian catch limits. About $6,000 bond was posted by the violators and 1,400 pounds of fish was seized. Harvey Willoughby of the U.S. Fish and Wildlife Service said, "It is not inconceivable that Canadian authorities may be compelled to consider closing their waters to southern neighbors if American fishermen do not clean up their act."

Across the continent and around the world, the vise is closing on an enjoyable privilege. Locally and nationally, sportsmen must work to hold on to their hunting privilege.

Each individual hunter must search his own soul and decide what he can do to help—what his conscience will let him do—and then he must do it. Hunting is an ancient tradition. It gives us an appreciation for the wild world. It's an important part of game management.

Sportsmen still have time to realize that bag limits and respect for the landowner's rights must be observed. If sportsmen don't demand behavior above reproach of each other, our hunting future may be behind us.—*Bill Pryor*

What price tag—if any—should go on this majestic bull elk? (photo: Harry Engels) Is it worth more than a Richardson ground squirrel? F&G photo: Mike Aderhold

How Much Is Wildlife Worth?

by Terry Lonner and Verne House

IN COLORADO, a porcupine has a price tag of $1.51; a skunk, $2.02; antelope, $234; deer $709; mountain lion, $1,600; bighorn sheep, $11,200; grizzly, $20,000, and black-footed ferret, $50,000.

These figures—based on harvest value or population size—may seem simple. But individual figures and, in fact, the entire system of attaching monetary value to wildlife has plenty of critics. Some think the figures are too high or low. Others think they are immoral.

Why is the value of wildlife so vague and intangible? Values for timber, grass and minerals are available because there is a market for them. Similarly, should values for wildlife and associated recreation be estimated?

Most laws dealing with multiple use of natural

resources, environmental impact and water development require that wildlife values be considered along with other uses. Aside from these laws, can resource managers make responsible decisions if the monetary values of wildlife are not included? If wildlife values are included, which system produces the most accurate estimate?

At issue is allocation of natural resources among competing uses. How does one assign a value to elk habitat as compared with recreational home development; irrigation needs with maintenance of minimum flows in fishing streams; wild horse herds with range conditions, or logging with water quality? This is not a new issue; it persists because of the way these nonmarket uses are owned and used and because there is not general agreement about methods of estimating their value.

There are two general ways in which public land can be managed: (1) Ownership can be vested in an identifiable entity that possesses rights of exclusion, or rights to set conditions and terms of access to the property, e.g., logging and grazing. Such land is called a private property resource. (2) If a resource is used, not necessarily owned, in common by all members of a country or community, it is called a common property resource; examples are wildlife, watersheds and wilderness recreation. Some of these common property resources such as wildlife can give resource management agencies the biggest headache. No generally accepted system identifies wildlife costs and benefits and the problem is further complicated because wildlife is often found on both public and private lands.

Under the Constitution, state fish and game departments regulate and manage wild animals and fish within each state. Therefore, "ownership" of most wildlife by states is regarded as a stewardship of the wildlife held in trust for the people. (Migratory animals such as waterfowl and raptors are covered by international treaty and fall primarily under federal jurisdiction.) Game animals can be hunted only under certain conditions. When they are captured or killed, they become private property. This use is sometimes called consumptive.

The other broad category is nonconsumptive use of wildlife. Capture or killing is not part of nonconsumptive use; even though wildlife is used for recreation, private ownership does not occur.

Obviously, consumptive users may also be nonconsumptive users, but the consumptive/nonconsumptive distinction is useful because wildlife management can be geared toward one or the other. For example, Yellowstone National Park wildlife is managed for nonconsumptive users.

Montana's wildlife is managed for both consumptive and nonconsumptive uses. Those species designated as game animals or furbearers by Montana law—deer, elk, moose, antelope, mountain sheep, mountain goat, mountain lion, bear, marten, otter, muskrat, fisher, mink, bobcat, beaver—are managed primarily for consumptive use, although they provide nonconsumptive uses, too. Other species—skunks, buffaloes, songbirds, etc.—provide only nonconsumptive use and receive less management.

There are several ways of participating in nonconsumptive use. *Direct users* view and photograph wildlife. The businesses of *indirect users,* such as grocery stores and gas stations, benefit from direct users. *Option holders* would vote to retain habitat for

Table 1—Appropriations and Revenues from National Forests by Function In Region 1 of the U.S. Forest Service, 1976

Function	Appropriation	Revenue
Recreation and public use	$ 2,803,200	$ 321,679
Wildlife habitat	1,134,200	none
Water, including power	1,731,300	9,167
Range management and improvement	1,961,000	872,381
Land classification and use	585,100	68,019
Mineral claims and leases	1,069,800	10,903
Timber management and sales	15,880,400	19,201,014
Fire, insect, disease control	5,485,100	none
Construction, land acquisition, roads	20,286,200	none
Totals	$50,936,300	$20,483,163

some creature to keep future hunting options open. *Vicarious users* may never see a grizzly bear but simply derive pleasure from knowing it exists. *Altruists* want to maintain wildlife resources for future generations. *Scientists* engage in genetic, behavioral and ecological studies of wildlife for management, medical research and education. Last is the *naturalist,* or the user who attaches value to all natural things.

There isn't a person alive who doesn't benefit in at least some small way from wildlife. But the cost of participating in wildlife uses, whether consumptive or not, is often out of line with benefits users receive. This leads to another important question in addressing wildlife economics: Who pays and what are the costs?

Users pay in several ways—direct payments in licenses and fees and indirectly through purchases of equipment, travel costs and taxes. Some users contribute little or no direct revenue toward management of wild land and this direct revenue is usually much less than the money appropriated by Congress. In Forest Service (FS) Region 1 (Montana, northern Idaho, North Dakota and northwestern South Dakota), the total appropriation for fiscal year 1976 was $50,936,300; revenue collected totaled $20,483,-163. (See Table 1.) Of the several functions listed, timber management was the only area where revenue exceeded appropriations—$19,201,014 compared to $15,880,400. In that year, approximately 94% of the revenue collected came from timber sales. Money from range management and improvement (grazing fees) amounted to 44% of that appropriated ($872,381, compared to $1,961,000), while revenue from recreation and public use was 11% of the appropriation and revenue from mining was 1% of the appropriation.

While the FS data for this region illustrate fiscal differences among users, they are ambiguous enough to lead us to incorrect conclusions. Revenues are, at best, a crude indicator of willingness to pay and, at worst, a gross underestimate of the actual value the public places on a given use of FS resources.

HUNTERS AND FISHERMEN are the forerunners in paying directly for conservation of wildlife through license fees and excise taxes on arms and ammunition sales. During 1976, this amounted to approximately $11.5 million in Montana—about 70% of the Dept. of Fish and Game budget. While the wildlife viewer or photographer generally pays much less than the hunter or sportsman, he does pay indirectly through income taxes and vacation or sightseeing costs. (The department also sells nongame stamps with revenue allocated directly to the nongame management program.)

In his recent book, "Forests for Whom and for What?", Marian Clawson, forest economist, divides users of both public and private forests into two groups: (1) "nonpaying guests" or "freeloaders," such as wilderness users, wildlife viewers and sportsmen and (2) "payers," which he defines primarily as timber harvesters. This classification of forest users can "raise the hackle on the necks" of many people, but it illustrates why it is difficult to coordinate wildlife resource management with other resource management.

The total benefits received by outdoor enthusiasts who enjoy the forest and all of its components in a natural or lightly developed state *may* exceed the benefits of harvesting timber for lumber.

Clawson also notes that outdoor recreation, wilderness area use, wildlife, general forest preservation and conservation—whether on public or private land—are forest uses for which only a small part is paid *directly*—probably less than 10% of either the cost of supplying the output or of its value.

"Every living creature provides a service to the ecosystem, so each contributes to the overall value in a collective, complex, interacting way."

Four costs not measured in these data should also be recognized:

- First is a human tendency to exploit common property resources because doing so may benefit the individual, but at the expense of the group. The individual exploiter pays only a fraction of the cost so there is an incentive to exploit and overuse the resources. For example, how many elk would there be if there were no hunting regulations?
- Second, wildlife must compete with marketable products such as timber, livestock grazing, irrigation water, coal, etc. The benefits of market goods are easily measured with money as the common denominator, whereas measures of wildlife are usually ambiguous.
- Third, people are impressed with technology. They should be, because technology insulates them from some of the evils of poverty and overpopulation predicted by Marx and Malthus. On the other hand, technology brings a new set of social costs so it, too, must be evaluated in benefit/cost terms. We treat technology like a bird dog—the dog is appreciated when it points the birds, but every time it breaks the point, the hunter wonders if he should have left the dog home. Another serious argument in wildlife management results from introducing technology into outdoor recreation. Lightweight backpacking equipment, recreational vehicles and compound hunting bows are examples of technology that require users to decide how and where they are appropriate.
- A fourth cost is reversibility of decisions. If an existing population of fish or wildlife reaches a level where its natural viability is no longer possible, the future is irreversible. Likewise, if the resource base available for wildlife habitat is committed to a new use, that decision may be irreversible—or at least very expensive to reverse. For example, how much would it cost to buy increased winter elk range from

Big Sky and neighboring developments?

In most resource management decisions, price is the information used to determine the optimum investment levels, the optimum rate of new investment, etc. How can decisions on wildlife investment, appropriate stock, rate of return or optimum level of management be made, when no values (prices) exist on which to base these decisions?

THE VALUE OF WILD ANIMALS can be expressed by ecological significance, social and cultural desirability and/or money. Values vary from individual to individual and wildlife values can be quite difficult to quantify. This is especially true for nongame species.

Ecological values—These values are not based on man's judgment, but on nature's judgment and the process of natural selection. All wildlife, from an amoeba to an elephant, has ecological value or it would not have evolved. Every living creature provides a service to the ecosystem, so each contributes to the overall value in a collective, complex, interacting way. Instead of money as the common unit of measurement, with the base unit a penny, the common unit of measurement may be energy, with the base unit a calorie. To a sheepman, a lamb may be worth 10,000 pennies; but to a coyote, that same sheep would represent 36,000 calories.

Social and cultural values—This classification of wildlife values is an all-encompassing one. Monetary values are certainly included, but since they are more rigid and definitive, they will be discussed separately. Social and cultural values are expressed by what people do, say and hold dear. These values are as important and respectable a basis for advocating whether a mountain should be logged or left alone, a river dammed or untouched, a wilderness protected or developed as is maximizing economic return.

The Multiple Use-Sustained Yield Act of 1960 states (in part) ". . . the management of all the variable renewable surface resources of the national forests [should be accomplished] so that they are utilized in the combination that will best meet the needs of the American people . . . harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, *with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output*" (emphasis added).

Social and cultural values also include aesthetics, education, various forms of outdoor recreation, personal philosophy, religion and ethics. These values define what each of us considers a quality life style—that is, as long as the paycheck is adequate and regular.

Monetary values—Wildlife is an economic good in the same sense that movies, housing and ice cream are economic goods. Some argue that wildlife is unique because of its aesthetic qualities, but many goods that pass through markets also possess aesthetic qualities, such as paintings and other works of art. As with all economic goods, time and money constrain wildlife activities just as they constrain consumption of market goods and services. Wildlife enjoyment does not pass through markets, but that doesn't mean it's free—time and money are limited and must be allocated among the various alternatives to maximize satisfaction. (See E. Boyd Wennergren's and Warren E. Johnston's article, "Economic Concepts Relevant to the Study of Outdoor Recreation," *Outdoor Recreation*, General Technical Report WO-2, U.S. Forest Service, Dept. of Agriculture, Washington, D.C.; March 1977, pp. 3-10.)

A few economists have worked for the last two decades to devise methods of estimating the monetary value of outdoor recreation, including wildlife, by observing recreationists' behavior. Simply put, the economist estimates the value by measuring what the recreationist spends—transportation, fees, lodging, equipment, etc.—and the value of the recreationist's time. Such data are usually collected by surveying recreationists, a time-consuming and expensive process. The data are then analyzed to estimate a "demand schedule," i.e., a table showing the amount of recreation participation by a "representative" recreationist at various levels of cost.

What good is this demand schedule? Managers and policy makers rarely mention demand except to misuse the term. Even so, managers and policy makers regularly use the value estimates derived from demand schedules to make decisions they hope will lead to efficient use of resources. The provision for wildlife is among these decisions. In their article, Wennergren and Johnston define the alternatives: "If we are content to permit *ad hoc* resource use and allocation (perhaps on the basis of political power or 'least friction' administrative decisions), and have no need to demonstrate productivity or contribution to social or individual welfare, then the concept of economic efficiency is irrelevant," the authors wrote. "If, however, we require some order and rationality to the allocation process, then value estimates are essential to achieve efficient allocation of scarce resources," they concluded.

Monetary values are used by managers and policy makers just as consumers use prices to make decisions about whether they are going to buy a new or used car or where they will work. Monetary values enter into the decision whether the values come directly from markets or they are indirectly estimated from consumer behavior. The decision-making process has the same goal—to provide the most satisfaction from the consumer's money and time. In practice, consumers' resources are efficiently allocated when the satisfaction gained for that last dollar spent is equal among the alternatives considered; producers' resources are efficiently allocated when the value of the production from the resources used is equal among alternative uses. These are not dicta from economists, but observations about how people tend to behave.

Economists generally agree about the importance of estimating values for wildlife and other outdoor

recreation, but agree less frequently about how to do it. Various laws require consideration of *all* uses of natural resources when analyzing management of federal lands and constructing federal projects. The objective, then, is to derive estimates that predict actual behavior, reflective of people's preferences.

MOST DISAGREEMENT among analysts about estimation methods centers around what should be counted. Obviously, different methods produce divergent estimates of value and result in questionable policy recommendations. Richard G. Walsh (writing in the same technical report, *Outdoor Recreation*, cited earlier) provides some guidance in solving this problem.

Two of Walsh's examples are cited to illustrate the point: (1) In the case of Rocky Mountain trout fishing, investment costs in recreation equipment increased estimates of value by two-thirds. (2) A Louisiana study evaluated the time spent fishing at $38 per 12-hour day and $27.50 for boating, water skiing and swimming. These are two to three times the values using the travel cost approach.

The commonly used "marginal cost of travel" approach, using only variable transportation costs, underestimates the actual value of outdoor recreation. In fact, Walsh indicates that what is usually left out

Critics often claim wildlife isn't fairly represented in environmental assessment or multiple-use planning. Yet, without a system of economic values, such representation will be difficult to attain. photo: Chuck Carlson

of value estimates may be larger than what is usually included.

Data from recent surveys, compiled by the Montana State University Dept. of Agricultural Economics and Economics and sponsored by the Montana Outfitters and Guides, questioned total versus net effects and secondary benefits. It sounds impressive that total income from guiding was about $6,680,000—about $16,485 per guide. The figures become much less impressive when expenses are estimated at $13,518, leaving a net income of about $3,000. The survey of clients indicates average expenditures were $1,167. This includes licenses, transportation, food, lodging, supplies, meat processing, outfitter, equipment rental, taxidermy and miscellaneous, but no value for time spent, fish and game management costs, equipment investment, etc. Clients reported spending nearly $26 million, $18 million of it in Montana.

To this expenditure in Montana, add benefits resulting from the "multiplier" effect. Each new dollar spent is, in turn, spent by the person who receives it. In the MSU survey, R.J. McConnen estimates these dollars "revolve or multiply" 2-1/2 times before they leave the state. The total impact is unknown because not all clients responded. But this is still an important industry, even though it is small compared to Montana's total personal income of $4.5 billion.

These surveys estimate the size and distribution of services provided by guides and outfitters. They reveal nothing about the value of specific wildlife species.

Similar studies for the state of Colorado and Grand County, Colorado show total sportsman expenditures for hunting and fishing of nearly $330 million statewide in 1973. About 2% of this is spent within Grand County. Again, this reflects impact, but provides no estimates of value for individual species. (This information appears in the summer 1977 publication, *Colorado Agribusiness Roundup.* The article, "Hunting and Fishing Contribute to Rural Income and Employment in Colorado," was written by John R. McKean and Dwight M. Blood.)

Another method estimates the value of game as the sum of time spent hunting multiplied by some wage rate, plus the pounds of meat taken multiplied by the price of ground beef. In his booklet, "Deer Production in the United States," Sidney W. Wilcox estimates the 1975 deer harvest in the United States yielded nearly 123 million pounds of boned meat. Multiplying by the 1975 national average of $1.15 per pound of ground beef gave a meat value of $134 million. To this, he added over 10 million archery days and 49 million shooter days at $40 per day.

Obviously, some very large numbers result from this approach. Performing thisestimate for Montana (using 90 cents per pound of ground beef) produced a wild meat value of nearly $6,695,000 and an overall recreational value (based on total hunter days) of about $60 million. Indeed, it might be argued that $40 per day is too high, that game meat is not beef and that the value of meat taken should be subtracted from—not added to—the value of hunting because it helps offset expenses.

FEW ATTEMPTS HAVE BEEN MADE to quantify the worth of a single harvested game animal, considering both recreational and direct monetary value. In a study of recreational use in Gallatin Canyon, Harold D. Picton estimated an elk bagged during the 1971 and 1972 hunting seasons was worth approximately $1,700. The market value of a live elk was calculated from an average of $225 paid per elk at an auction in 1970. The market value of recreation was computed using $50 per day, based on the market value of outfitter-furnished recreation. (Local hunters usually don't pay this particular cost for their hunting, so the amount represents a quality of living bonus for living close by.) When dividing the average annual recreational value of elk hunting (number of recreational days multiplied by $40 for an average daily wage) by the average annual elk harvest for 1971-1975, the value of an elk computed to $1,924. This is not much different from the $1,700 Picton calculated. (For more information, see Picton's paper, "The Gallatin Human-Wildlife Community, Montana," Montana State University-National Science Foundation Gallatin Canyon Study Research Monograph No. 18, Dec. 1976.)

Picton further estimated the value of nonhunting use in Gallatin Canyon. The average total expenditure and recreational value per winter for the winters of 1971-72, 1972-73 and 1973-74 was $115,107.

The Colorado Division of Wildlife currently uses a list showing value by species. The price of an individual within each species is listed for terrestrial animals. On this list, aquatic species are priced per acre of habitat. An elk is priced at $5,639. Prices for other species ranged from $1.21 for a muskrat to $50,000 for a black-footed ferret, and from $520 per acre for pan fish to $10,000 per acre for cutthroat trout.

Fur-bearing animals or animals sold for their pelts are probably the most reliably priced wildlife, because a true market exists. During the 1975-76 trapping season, $647,695 was paid by Montana furriers for pelts acquired in the state. This amount is probably an underestimate of the total price received for all pelts, since many trappers sold pelts out of state. The average price paid per pelt was $105 for the wolverine, $154 for the bobcat and $174 for the lynx. Coyotes averaged $37 and fox, $35. The recreational value of this type of outdoor activity is not known, but in some states 10%-20% of the trappers take 80%-90% of the animals, which means the majority of the participants are trapping for recreational purposes.

Gene Allen, chief of the department's Research Bureau, offers an unusual method for pricing a coyote. The following equation is based on a year-round maintenance food intake level for a coyote of 1½ pounds per day and a diet averaging 50% rodents (a conservative estimate):

—1-1/2 pounds of food per day
—.75 pounds of rodents per day
—275 pounds of rodents per year per coyote
—124,850 grams of rodents per year

—At an average weight of 34 grams, this equals 3,675 mice per year.
—A mouse eats about 5 grams of grass per day and about 4 pounds per year.
—The 3,675 mice eat 14,700 pounds of grass per year.
—Using 780 pounds per animal unit month (aum), 14,700 pounds of grass equal 19 aum's. (An animal unit month designates the length of time required to sustain 1,000 pounds of live weight [one mature cow, with or without a calf up to six months old], or five sheep, for a unit area.)
—At $6 per aum, that equals $114 worth of food per coyote.

Could a coyote be worth more alive than dead?

THIS ARTICLE ATTEMPTS to point out some approaches and frustrations involved when trying to incorporate the wildlife resource directly into the resource allocation processes. Without doubt, wildlife in Montana, as well as nationally, is a tremendously valuable resource but with many allocation problems. It is valuable not just in terms of economic benefits, but also as a vital component in maintaining the wholesomeness of life. As Valerius Geist wrote in his book, "Mountain Sheep and Man in the Northern Wilds," "Our 'standard of living' is a function of vanity, no doubt an important biological attribute of man, but one that need not be satisfied at the cost of looted landscapes and broken cultures...."

Reviewing research on estimating wildlife values shows that much research needs to be done to arrive at estimates leading to efficient and fair allocation of resources. On the one hand, this is discouraging because so much needs to be done. Economists must first come to more general agreement about what should be included and excluded; second, several studies estimating value are needed. Until then, market uses of resources will be described in dollars and nonmarket uses in user-days and prose, a situation that hardly facilitates rational comparison.

On the plus side, a number of substantial studies have been done, especially on fisheries, which provides a foundation on which to build. Policy makers have recognized the need for data to plug into the decision models. The economic theory has been thought through; the big problems are methods of analysis and cost of data collection. Another encouraging note is found in the eclectic approach to the problem. Wildlife researchers and economists are beginning to think of the problem in terms of human motivation. David A. King and Merton T. Richards (writing in the same technical report, *Outdoor Recreation,* cited earlier) are digging through fundamentals of human behavior as they affect individual choices and decisions about outdoor recreation. They observe that "the economist cannot ignore the contributions, actual or potential, of other social scientists towards explaining recreational behavior. Nor can recreational behavior be adequately explained if the economic aspects of such behavior are ignored."■

Suggested Reading

Clawson, Marian, "Forests for Whom and for What?", Johns Hopkins University Press, 1975, 175 pages.

Geist, Valerius, "Mountain Sheep and Man in the Northern Wilds," Cornell University Press, 1975, 248 pages.

King, David A. and Richards, Merton T., "Determinants of Choice in Outdoor Recreation," *Outdoor Recreation,* General Technical Report WO-2, U.S. Forest Service, Dept. of Agriculture, Washington, D.C., March 1977, pages 91-97.

Krutilla, John V. and Fisher, Anthony C., "The Economics of Natural Environments," Johns Hopkins University Press, 1975, 292 pages.

McKean, John R. and Blood, Dwight M., "Hunting and Fishing Contribute to Rural Income and Employment in Colorado," *Colorado Agribusiness Roundup,* Cooperative Extension Service, Colorado State University, Fort Collins, summer 1977, pages 14-16.

Montana Dept. of Fish and Game, "A Strategic Plan for the Comprehensive Management of Fish and Wildlife Resources in Montana 1977-1982," 1976, 159 pages.

Nobe, Kenneth C. and Steinhoff, Harold W., "Values of Wildlife," from "Proceedings of the Governor's Conference," Eugene Decker and Gustav A. Swansen, editors; 1973, pages 32-37.

Norman, Richard T. and others, "Using Wildlife Values in Benefit/Cost Analysis and Mitigation of Wildlife Losses," Colorado Division of Wildlife, Denver, 1974, 18 pages.

Picton, Harold D., "The Gallatin Human-Wildlife Community, Montana," Montana State University-National Science Foundation Gallatin Canyon Study Research Monograph No. 18, Institute of Applied Research, Montana State University, Bozeman; Dec. 1976, 56 pages.

Walsh, Richard G., "Effects of Improved Research Methods on the Value of Recreational Benefits," *Outdoor Recreation,* op. cit., pages 145-153.

Wennergren, E. Boyd and Johnston, Warren E., "Economic Concepts Relevant to the Study of Outdoor Recreation," *Outdoor Recreation,* op. cit., pages 3-10.

Wilcox, Sidney W., "Deer Production in the United States," Arizona State University, Tempe, 1977, 4 pages.

Should Old Acquaintance Be Forgot?

Never. Send a gift subscription to *Montana Outdoors*. Even Old Scrooge couldn't complain about the price—only $8 for three full years. In addition, anybody *giving* a three-year gift subscription receives the Montana wildlife calendar. Normally, the calendar sells for $2, but by giving a three-year subscription, it's yours *free*.

Just think how easy Christmas shopping will be—no hassle, no lines, no traffic, no gift wrapping. And the gift you give—a colorful, interesting outdoor magazine—lasts three years, is guaranteed to fit and won't wear out. And with this method, you give yourself a gift, too—a beautiful calendar.

If you don't care for this offer, you can still order a one-year ($3) or two-year ($5.50) subscription for yourself or somebody else or buy the calendar for $2. Use the handy order card bound inside this magazine.